

# FLIGHT

&  
THE AIRCRAFT  
ENGINEER.

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 455. (No. 37, Vol. IX.)

SEPTEMBER 13, 1917.

Weekly, Price 3d.  
Post Free, 4d.

## Flight

and the "Aircraft Engineer."

Editorial Office: 44, ST. MARTIN'S LANE, LONDON, W.C. 2.

Telegrams: Truditur, Westrand, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free.

United Kingdom .. 15s. 2d. Abroad.. .. 20s. 6d.

### CONTENTS.

	PAGE
Editorial Comment :	
The Navy League and Aerial Policy .. .. .	935
But how about the Aerial League? .. .. .	936
Air Raids and their Lessons .. .. .	936
The Treachery of Sweden .. .. .	938
The German Goetz Bombing Sight .. .. .	939
The Roll of Honour .. .. .	942
The Royal Aero Club. Official Notices .. .. .	943
The Question of Fabric. By Aeromot .. .. .	944
"X" Aircraft Raids .. .. .	945
From Other Lands .. .. .	946
Correspondence .. .. .	949
The Determination of Parachute Velocity. By A. J. De Zoysa,	
A.M.I.C.E., &c. .. .. .	950
Airisms from the Four Winds .. .. .	951
The British Air Services .. .. .	954
Aircraft Work at the Front. Official Information .. .. .	955
Personals .. .. .	957
A New Safety Coupling Joint .. .. .	958
Side-Winds .. .. .	959

## EDITORIAL COMMENT.

**O**N another page of this issue of "FLIGHT" we publish a series of resolutions passed by the executive committee of the Navy League relative to British aerial policy. These resolutions, it will be seen, commit the League to full and complete acceptance of the programme which this Journal has consistently advocated since the very earliest days of the movement. They predicate that the command of the air is of vital importance to our future as a maritime Power and as a united Empire. They accept that, notwithstanding the experience of the war, it is still the fact that the dominant part which air power plays in the preservation of British liberty and security has not yet been fully recognised by the nation and by those responsible for the direction of national affairs. Therefore, the Navy League definitely adopts air policy as a concrete part of its propagandist and educational activities, and intends to urge upon the people that as aircraft must become

### The Navy League and Aerial Policy.

more and more the eyes of the British Fleet it will be a vital factor in the determination of future naval policy. Further, the League pledges itself to support the demand that an all-powerful air fleet, as the necessary complement of the British Navy, with an Air Board raised to the status now enjoyed by the Board of Admiralty, shall be created.

Needless to say, we are in the fullest agreement with these resolutions and the policy for which they stand. The Navy League, in virtue of its constitution and objects, is necessarily more or less confined to matters affecting sea power, and it is thus understandable that the resolutions have been so worded as to convey the first impression that they are directed mainly to the creation of an air fleet as complementary to the Navy. We ourselves have held that it is more a case of broadening the basis and laying down that what is required is a preponderating air fleet, complementary neither to Navy nor Army, except in the sense that aircraft will always be called upon to work in conjunction with naval and military forces within limits. By that we mean that in all military or naval operations of the future aircraft will play a great tactical part. They must always be the eyes and ears of fleets and armies, but over and above that there is a great strategic rôle to be filled, and aerial policy, therefore, goes much deeper than the mere provision of enough aircraft to carry out observation and to establish so much of definite local superiority as will enable the observers to carry out their work with the minimum of interference by the enemy. For that reason we would prefer to accept the Navy League resolutions with a slight reservation, simply dropping out the words "as the necessary complement of the British Navy" from Resolution 5, and go frankly out for a policy of "an all-powerful air fleet . . . with an Air Board raised to a similar status to that enjoyed by the Board of Admiralty." We fully agree that the wording of the resolution does not conflict in any way with our own definition of what is necessary, but we have it in mind that what is requisite now is to create the great volume of public opinion essential to the carrying out of that policy, and to that end the plainer the issues can be made the better. We would leave no room at all for misunderstandings—the real command of the air is what we want, and the plainer we can make this to the nation the better chance there will be of the attainment of that objective.

**But how  
about the  
Aerial  
League?**

While we whole-heartedly welcome the action of the Navy League, there is just one point that occurs to us which needs clearing up. That is, how will the new propaganda of the Navy League fit in with the work of the Aerial League of the British Empire, which is now apparently taking a new and purposeful lease of life? It should be assured that the two programmes do not clash. Without question the more propaganda work that is done the better it will be for the common cause, always provided there is no conflict of object or purpose in the respective programmes. The Aerial League, under its recently appointed general secretary, Mr. Jerome Dyer, is embarking on a very extensive missionary campaign, and it would be a thousand pities if the work were to be stultified in the slightest by want of mutual understanding between two bodies which are both sincerely out to do their patriotic best in the great cause of air power. The Aerial League, with its present widespread organisation, through the Overseas Aerial League and another working war association, stands for a great Imperial Air Fleet without reservation. The Navy League, as set forth in the resolutions discussed in a previous paragraph, is for the same thing, except that, as we have pointed out, it has been careful to avoid any suggestion of a desire to trench upon the work of any other body and has made the clear reservation that it wants an air fleet as the complement of an all-powerful Navy. There is no point of conflict between the two, and we suggest that it will be well that there should be a discussion between the executives of the two Leagues in order that no misunderstandings should arise. We certainly do not want anything of the Codlin or Short description to enter into the campaign which lies ahead, either now or hereafter.

**Air Raids  
and their  
Lessons.**

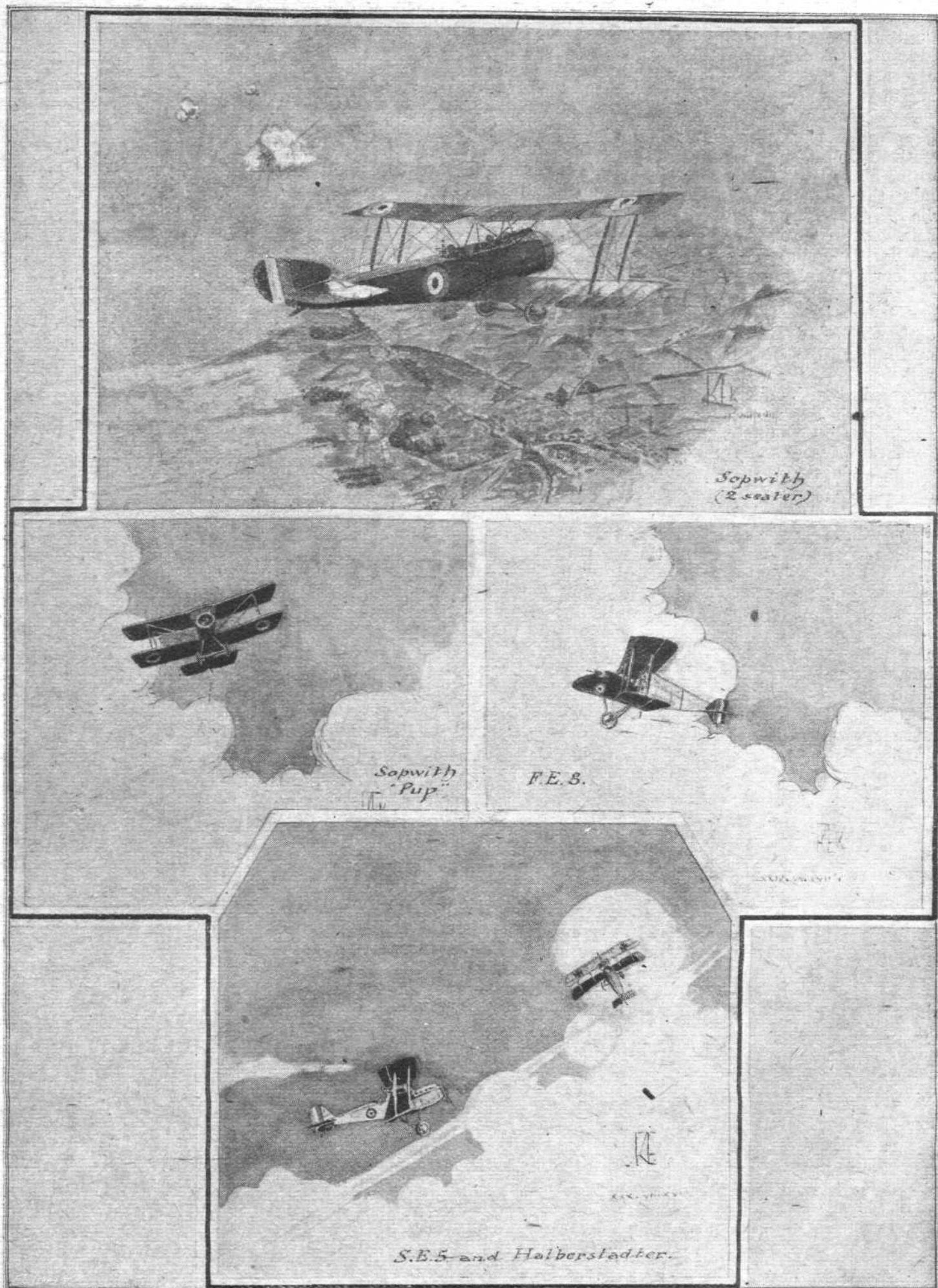
Since last week's midnight raid on the London area by enemy aircraft it has been curious to watch the comments of the Press on the subject of air raids and the policy they impose on our own defensive organisation. One section blames the Army authorities and wants to get rid of everybody. Another gravely lays it down that air raids are an inevitable part of the price we have to pay for being at war with an undoubtedly clever and enterprising, if utterly unscrupulous, enemy, and, without saying so in actual words, gives its public to understand that the policy of "darkness and composure" is the only one that is of the slightest good to us. In one direction, however, comment is absolutely unanimous, and that is in the matter of an aerial counter-offensive, which is called for by the whole Press of the country, irrespective of political or any other creed.

First, as to the measure of blame which attaches to our own military authorities—if any—upon which one section of the Press, as we have said, insists. Whatever we may think of raids by daylight and the possibility of preventing them—and frankly we do not think they can be absolutely prevented, whatever defensive measures are adopted—we are certainly of the opinion that raids by night cannot be entirely stopped so long as the enemy has the machines to spare and the men to fly them. The difficulties of the defence are heavy enough when raids by daylight alone have to be dealt with, but when it comes to dealing with aeroplane attack in

the dark, then they become still more onerous to counter. It is one thing to deal with the huge and comparatively slow-travelling Zeppelin, which can be held by the searchlights and which is large enough to form something like a target for anti-aircraft guns, and, moreover, which is especially vulnerable to modern aeroplane attack. It is quite another, however, to tackle the far more mobile aeroplane, which is practically immune from gunfire in the dark and difficult to find by the friendly aeroplane. Not to beg the question any longer, we do not think there is any positively effective defence against the night raid. At any rate, there is no known method at present, whatever may be evolved later as the result of experience. Therefore, we cannot agree that any culpability attaches to the military authorities entrusted with the defence of our shores. We know that they are fully alive to the danger and have given all possible study and thought to the best methods of warding it off. We know that our gunnery defences have been improved out of all knowledge in comparison with even a few months ago. We know also that the officers of the R.N.A.S. and the R.F.C. do not hesitate to take any and every risk in flying at night in the effort to bring down the raiders and show the enemy that the game is not worth the candle. In a word, we are fully satisfied that everything possible is being done defensively that the limitations of our knowledge and resources will permit. So much for that aspect of the question.

It will be noted that we have laid some amount of emphasis upon the purely defensive measures that have been and are being taken to combat this new form of war. As we have said, we are quite satisfied as to these, and were there nothing to be done beyond accepting the rôle of the actual defensive, as opposed to that of the offensive-defensive, we should be content to view these raids as one of the risks of war from which there is no escape. But to our way of thinking—and the whole public opinion of the country is with us—there is much more that can be done. We can carry the air war into the enemy's own country and treat him to copious doses of his own frightfulness, which would be the best possible deterrent measure we could adopt. It is perfectly futile to talk about the killing of innocent non-combatants at this stage of the war. Germany hopes by a continual policy of raids to paralyse our will to victory, trusting to our own sense of decency to escape retaliation in kind, and so long as she can carry on the game with impunity she will continue to raid us. She will certainly not achieve her object, because the British people are not built that way, but that is beside the point. We are all in favour of a policy of the counter-offensive pursued to its bitterest end, if *and when* it can be carried out without sacrificing some more immediately important military object. This is an important reservation, but we make it because we consider that it is very necessary indeed for us to preserve a proper sense of proportion in the matter. As we say, we believe in the counter-offensive, which we verily believe would go very far to stop German raids on England; but we will go the length of saying that we had rather put up with them than that the winning of the war should be delayed by its pursuit. As a matter of fact, it is clear to the ordinary reader of the newspapers that we are, in fact, carrying out a very strong counter-offensive in the air, and that for one ton of bombs





Some unique sketches of aircraft at work overseas by Captain K. H. Riversdale Elliot, Scottish Rifles and R.F.C.. The drawings are particularly accurate and full of movement, and carry the greater weight as from an active pilot.

dropped on British towns our airmen are dropping five tons or more on important enemy points. True, we have not yet laid Cologne in ashes, but we may take it that if the best *military* effect were to have been obtained by constantly bombing Cologne or any other of the Rhineland cities, it would have been done in preference to the bombing of Ghistelles, St. Denis-Westrom, Zeebrugge and Bruges and other places which constantly figure in the reports issued by the Admiralty and the War Office relative to British air raids. That is, it would have been done under the circumstances if we assume that those who direct naval and military policy are fit for their posts. As we do assume that these authorities are so fit for their posts, we are driven to the assumption that our principal objectives can be better attained by leaving the cities of the Rhineland alone for the time being and concentrating attention on other points which have, for the time being, more military importance. Incidentally, one of the best answers to the school of prevention, as we must call it, is contained in the official reports of our own night raids, which tell us, day by day, that "all our machines returned safely." It seems to follow that if the Germans cannot bring down our night-flying machines in raids on known objectives, it is fairly hopeless to expect our own people to deal adequately with German haphazard raids on British towns.

The whole question is simply one of a sufficient number of machines to carry out the tactical functions necessary at the Front, to give reasonable protection at home, and to embark on a great aerial offensive against Germany. It would be well if we had enough, but the plain fact of the matter seems to be that for the moment we have not, and that in the meantime we must be content to go for the objectives which will give us the maximum of military effect. Naturally, the question arises of why we have not sufficient aircraft to enable us to extend the aerial offensive to include the whole of the objectives. The answer to that we do not propose to discuss now. It has been dealt with at considerable length in the pages of "FLIGHT" on many occasions, but we are not concerned with it at the moment. What is under discussion is the actual position at the moment, and this we have endeavoured to set forth.

#### The Treachery of Sweden.

It seems to us that the main lesson to be learned from the unmasking of the treachery of Sweden is that there are no longer neutrals in this war—that those who are not with us are against us. There are no words in the language to adequately describe the devilry of German diplomacy, which is convicted of deliberately plotting the murder of nationals of the

country to which her representatives are accredited. Nor are there terms fit for polite ears to describe the conduct of Sweden, or, rather, of Swedish officials who have broken every canon of international decency by assisting Germany in her policy of indiscriminate murder on the high seas, a policy which has been directed as much against their own people as against those of other neutral nations. Until it is proved to the contrary, we decline to believe that the Swedish people are at one with their officials. Swedish ships have been sunk and Swedish seamen done to death by Hun submarine commanders, and it would be impossible to think that Sweden herself could acquiesce in the despicable policy which her Foreign Office and its representative abroad appear to have identified themselves with, in face of the most solemn assertions of impartial neutrality. Fortunately it is for Sweden that the Allied Powers are actuated by no aggressive ideals in the carrying on of the war, else the disclosures of the week-end would unquestionably have been taken to constitute a *casus belli* without further ceremony or inquiry. We have no hesitation in saying that had the positions been reversed and had Germany discovered one of the Scandinavian neutrals at a similar game directed against herself, she would have declared war on the instant. However, Sweden has the good fortune not to have Germany to deal with, and will at least be given time to make what explanations she is able. Whether these will dispose of the case against her to the satisfaction of the Allies remains to be seen, and until those explanations have been tendered it will be as well to suspend judgment. Another reason which renders delay advisable is that the elections are taking place in Sweden and the people will thus have an opportunity of pronouncing their verdict on the conduct of those who have hitherto been charged with the conduct of their affairs. If they endorse it, then we know where we are. If they condemn it, and turn these traitors out of Swedish public life—well, the Entente does not make war on peoples who desire to observe the decencies of civilised intercourse.

There is some reason to think that the official anti-Allied feeling in Sweden has its genesis in a higher quarter than even the Foreign Office and that, as in that of Constantine of Greece, it is once more a case of *cherchez la femme*. Unquestionably, the sympathies of the Swedish Royal House have been with Germany from the first, as was to be expected when we remember the close relationship subsisting between the German and Swedish ruling families. If it does nothing else, the episode supplies yet another cogent argument for getting rid of the Hohenzollern taint, not only from the German Court, but from all the Courts of Europe.

#### The Navy and Aerial Policy.

At a meeting of the Executive Committee of the Navy League, held on the 6th inst., at the Central Offices of the organisation, 13, Victoria Street, S.W.1., Colonel Wilfrid Ashley, M.P., presiding, the following resolutions were unanimously adopted:—

1. That the achievement of such supremacy in the ocean of the air as the Navy enjoys on the surface of the sea should be an essential feature of British national policy.
2. That the command of the air is of vital importance to our future existence as a maritime Power and as a united Empire.
3. That, notwithstanding the experience of the war, it is still unfortunately the fact that the dominant part which air power plays in the preservation of British liberty and security

has not yet been fully recognised by the nation and by those responsible for the direction of national affairs.

4. That the Navy League definitely adopts air policy as a concrete part of its propagandist and educational activities, and by every means possible shall urge upon the people that, as aircraft must become more and more the eyes of the British Fleet, it will be a vital factor in the determination of future naval policy.

5. That the Executive Committee of the Navy League, therefore, invites the co-operation of the presidents and chairmen of all branches of the organisation in the United Kingdom and overseas in the advocacy of this view and in support of the demand that an all-powerful air fleet as the necessary complement to the British Navy, with an Air Board raised to a similar status to that now enjoyed by the Board of Admiralty, shall be created.



# THE GERMAN GOERZ BOMBING SIGHT.

By JEAN-ABEL LEFRANCE.

AMONG the instruments found on a Gotha bombing machine shot down by Capt. Guynemer some months back, was a Goerz telescopic sight- or range-finder. By the courtesy of the Editor of the SCIENTIFIC AMERICAN we are able to reproduce a description of the device, together with some notes on the laws governing the dropping of bombs, contributed by M. J. A. Lefrance to LA NATURE.

Any projectile dropped from a height is subject, of course, to two constant forces—the resistance of the air and the acceleration due to gravity. Its trajectory is a vertical line from the point of discharge A to the striking point B (Fig. 1). If a bomb be dropped from an airship in motion it will have an initial speed equal to and in the same direction as that of the latter. This new force is compounded with the two former and the result is the curved trajectory AC.

If this bomb, having a given initial velocity, is dropped into a layer of air in motion, that is, into the wind, it is

earth is known, since this velocity of the wind is the difference between the velocity of the avion with respect to the earth and its normal velocity in the wind, an element which is fixed for a given type of avion.

Take an avion having a normal speed of 150 kilometres per hour. If it is only going 100 kilometres per hour with reference to the earth, then it is flying against a head wind of 50 kilometres per hour. Hence it is only necessary to know the height of the avion and the initial speed of the bomb to determine a trajectory. This method of calculating

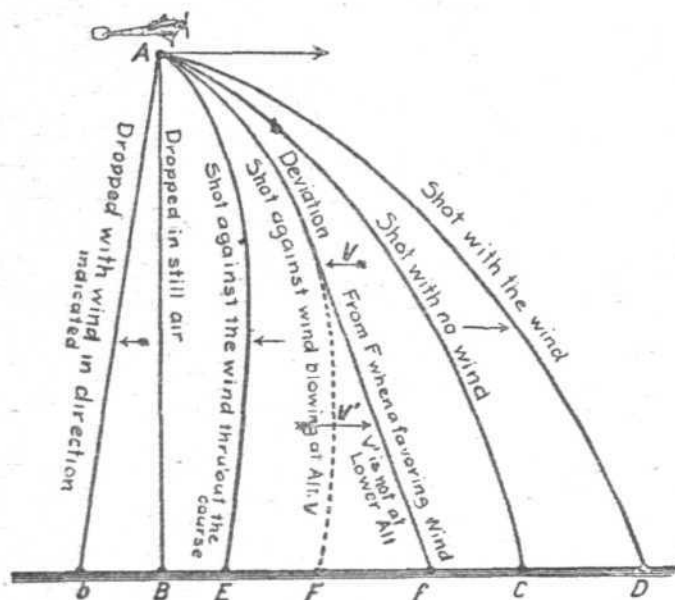


Fig. 1.—Trajectory of a bomb falling from an aeroplane as affected by the direction of the wind.

acted on by the latter, and is said to undergo "drift." If the wind is at the back the trajectory is lengthened, as in AD; if there is a head wind the trajectory will be shortened as in AE.

If the bomb be dropped from an avion which the strength of the wind causes to be stationary with respect to the ground, i.e., when the velocity of the wind is exactly equal to that of the avion and in the opposite direction, the projectile will have no initial velocity, and the curve of its trajectory will be a function solely of the drift produced by the wind, as in Ab; it will therefore fall to the rear of the point of departure. This latter case, however, is exceedingly rare, since it presupposes a wind of 120 to 150 kilometres per hour; but this is a gale too high to permit the sending up of aviators.

The trajectories being given, the angle of aiming will be the angle formed by the vertical line AV at the point of departure A, with the straight line joining this point A with the striking point O, i.e., the angle VAO.

Since these trajectories are curves, the height of the avion above the object aimed at is an element which modifies the value of the trajectory. Since the wind causes drift this drift will vary with the form of the projectile and with the velocity of the fall. Here we have two elements which are constant for each type of bomb.

To resume, the trajectory of a bomb discharged from an avion is the resultant of the following forces.

Weight } Elements constant for a given type of bomb.  
Form }  
Drift }

Speed of avion in wind { Considered as a constant for a given type of avion.

Other Elements.

Height of shot } Variable elements.  
Initial speed of bomb, i.e., of avion with respect to ground }  
Velocity of head wind }

Of these three principal variable elements which it is necessary to know for each case of bombardment, one of them—the velocity of the head wind—can be immediately deduced when the velocity of the avion with reference to the

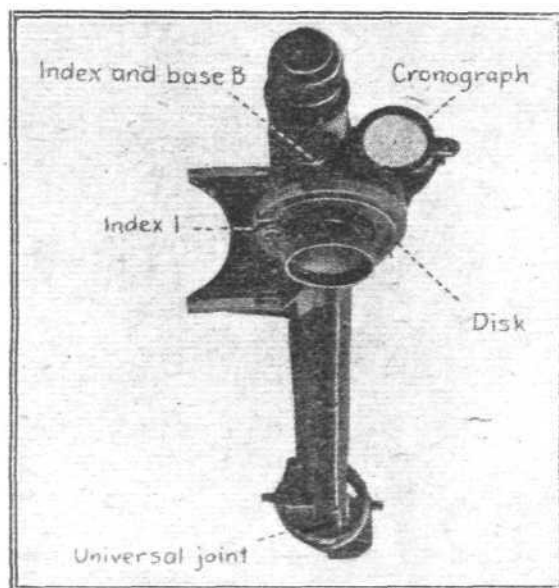


Fig. 2.—The Goerz range-finder.

trajectories seeks to base itself on science in order to obtain a mathematical precision in its results. Unfortunately it is based upon a probable knowledge of atmospheric conditions, which are essentially capricious. Particularly, the speed

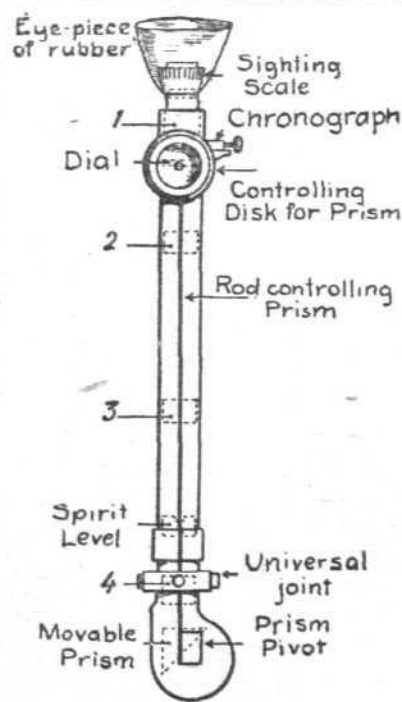
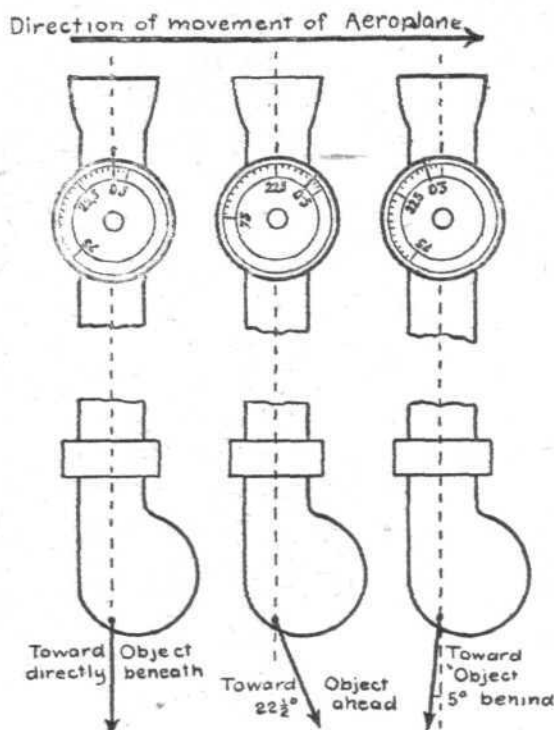


Fig. 3.—Diagram showing construction of the Goerz range-finder.

of the wind at the height of the avion is taken into account, e.g., at 4,000 metres, but it is supposed that this remains unmodified down to the ground, which is rarely the case in reality. It may also be that, starting from 3,000 metres, the wind changes its direction so much that the best calculations, the best telescopes and the best bombardiers, are unable to secure a correct aim, so that some authorities

despair of ever being able to get results in aerial bombardment comparable to the efforts made.

**Goerz Range-finder.**—This is certainly the best and most highly perfected effort of German science to find means of destroying railroads, factories and populations outside the range of their big guns. It consists of a telescope about



Figs. 4, 5, and 6.—Direction of aim in the finder.

1 metre long. Mounted on a universal joint, it can be oriented in every direction and kept strictly vertical, whatever be the position of the avion (Fig. 2). The accompanying diagram (Fig. 3) shows the *ensemble* of the optical system. The field obtained is 500/1,000 and the enlargement is 1.5.

At the base of this telescope is a prism mounted on a pivot and controlled by a graduated disk. The telescope remaining vertical the play of the prism permits the visual ray to be inclined a number of degrees corresponding to the graduations of the disk.

On this disk are two indexes—one corresponding to the vertical speed or dead point of the range-finder, and the other to the vision of  $22^{\circ} 30'$ . Another index serves as a basis; it is fixed on the body of the range-finder. At  $0^{\circ}$  the marksman sees the ground along the vertical (Fig. 4); at  $20^{\circ}$  the inclination of the visual ray is  $20^{\circ}$  in front of the avion (Fig. 5); at  $5^{\circ}$  the inclination is  $5^{\circ}$  behind the avion (Fig. 6).

A small index is movable upon the disk, but can be made solid with it by means of a little detent. This index once fixed before a graduation of the disk, after passing the dead point, falls into a small notch, and thus informs the gunner that he sees the ground according to the inclination which he had marked with this index. This is disengaged by a slightly stronger pressure of the hand.

In the body of the telescope is a spirit-level. The edges of the air bubble are refracted in such manner that they appear in the form of a black circle, which serves as a sighting centre for the telescope. In the course of all his range-finding operations the gunner must keep this bubble in the centre of the ocular, which will keep the range-finder vertical no matter what the inclination of the avion is.

The universal joint permits the finder to incline freely from right to left or from front to rear; but when it revolves around its vertical axis—i.e., when the visual ray, instead of being directed in front of or behind the avion, is directed to the right or the left of the route followed—the finder acts upon a route corrector. This consists of an electric device. Resistances act upon a very sensitive galvanometer placed in front of the pilot, and indicate to him how to correct his route in order to make it pass exactly above the object to be bombarded.

**Method.**—There are only a few of the elements constituting a trajectory which can differ in the course of each bombardment—the height of the avion above the object, the initial velocity of the bomb, the speed of the wind. The German method of the Goerz finder enables a calculation of these three elements to be made.

1. The height is obtained by subtracting from the altitude range shown on the altimeter of the avion the altitude of the object bombarded: e.g., if the avion is flying at 4,200 metres above sea-level, and if the factory to be bombarded is 200 metres, then the height to be reckoned with will be 4,200—200=4,000 metres.

This method, moreover, is subject merely to very slight errors where high altitudes are in question. Example: At 90 kilometres an error of altitude of 500 metres for an avion at 4,000 metres corresponds to an error of only 25 metres at the ground level (Fig. 7).

2. **Initial Velocity of the Bomb.**—In reality this is the speed of the bomb with reference to the ground. This element is the most difficult to know, because it varies with the velocity of the wind, which is in a state of perpetual instability. If an avion possesses a speed of 150 kilometres and the wind is blowing at the rate of 50 kilometres, then with a following wind the avion will travel at 200 kilometres per hour, while with a head wind it will go only 100. This difference of speed considerably modifies the trajectories, as can readily be seen by examining the curves in Fig. 7, in which the avion is going 120 and 60 kilometres per hour respectively. In place of being simply added or subtracted this speed of the wind and speed of the avion may be compounded if the avion receives the wind, for example, three-quarters to the rear (175 kilo-

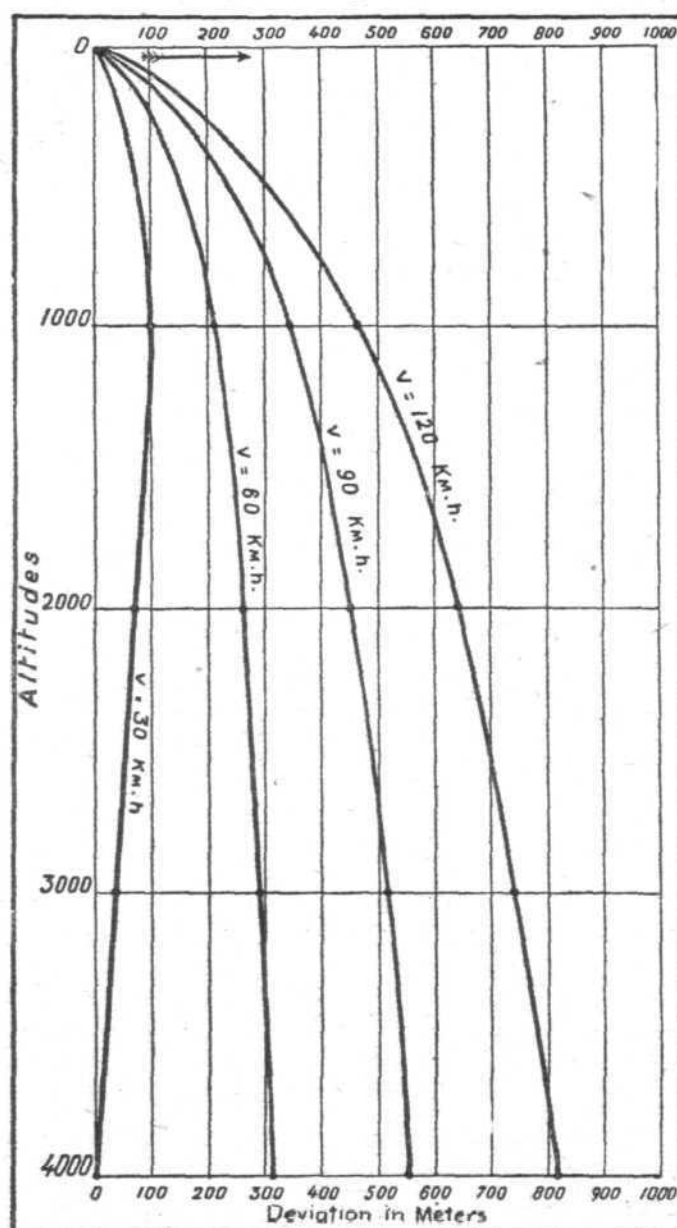


Fig. 7.—The falling curves of bombs at different speeds.

metres per hour) or three-quarters head on (125 kilometres per hour).

In principle, to simplify the calculations, the avion should bombard with the wind head on, i.e., with the speed as much reduced as possible. To determine this kilometric speed of the avion we calculate the time required by a fixed point on the ground O to traverse an angle fixed at  $45^{\circ}$  or  $22^{\circ} 30'$ .

It is easy to see by the figure that the time required by an avion to find the range of the same point successively first



with an angle of  $22^{\circ} 50'$ , and then vertically, is proportional to the speed of the avion with respect to the earth. A value in seconds is obtained.

A previously prepared table will indicate that the avion being at an altitude of 4,000 metres, a point on the ground takes 36 seconds to pass through an angle of  $22^{\circ} 30'$ , then the avion is going 100 kilometres per hour, with reference to the earth. If the point takes only 18 seconds to pass through the same angle, the avion is going 200 kilometres per hour. This value is the initial horizontal speed of the bomb.

3. Moreover, it is known that avions of the Gotha type have 150 kilometres per hour speed when the motors are revolving at their usual velocity. If the preceding range-finding shows the speed at the ground to be only 100 kilometres per hour, the obvious deduction is that the head wind has a value of 50 kilometres. Thus all the elements of the trajectory sought are known. It remains only to read on the

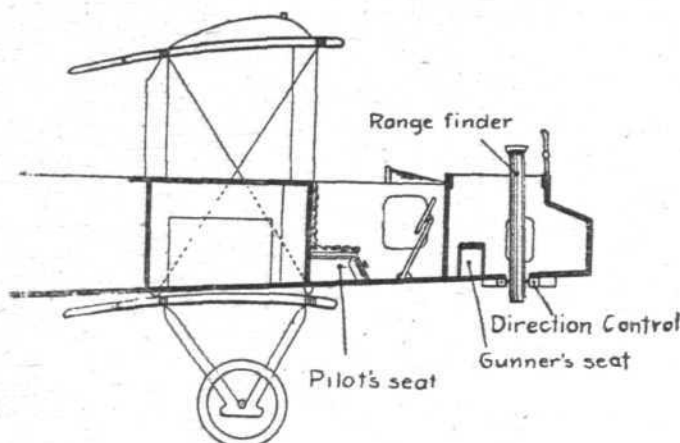


Fig. 8.—Location of the finder upon an aeroplane.

chart which firing angle is suitable to cause the bomb to fall on the given object, in view of the given elements.

Let us observe the application of this method to bombardment by means of the Goerz range-finder and its chart.

**Application.**—The finder is under the control of the forward gunner. The bomb releaser, in reach of his right hand, is worked by pressing on levers which liberate the bombs by means of flexible controls (Fig. 8).

Several minutes before arriving over the object to be bombarded it is necessary to acquire a knowledge of two elements which will enable the gunner to read on the chart the proper firing angle. The altitude range on the barometer less the altitude of the object gives the height of fall of the projectile.

To obtain the second element which will give a knowledge of all the values of speeds we have recourse to the method of previous range-finding of the ground, explained previously.

The index of the graduated disc is fixed at  $22^{\circ} 30'$ . The range of any point whatever on the ground forward of the avion is found—a route perpendicular to the one followed (a river, a house, the edge of a wood). This point is caught in the circle formed by the air bubble, and followed while turning the disc until the index falls into the notch at the dead point. At this instant the seconds chronograph is released and the terrestrial point continues to be followed in the range-finder until the  $0^{\circ}$  of the disc is checked at the dead point; the chronograph, immediately stopped, gives a number of seconds which, when found upon the chart in the line of altitude, indicates the speed of the avion with respect to the ground, and the sighting angle to make use of—for example,  $10^{\circ}$ .

#### Air Raid Precautions.

THE following was officially issued on Sept. 5th :—

"The results of last night's raid bear out the importance of persons in the open taking the best available cover as soon as they know a raid is proceeding. The comparative lightness of the casualties may be attributed in large measure to most persons having been under cover. Persons in the open run greater risk than those under cover, and when the simple precaution of going indoors and, wherever possible, moving to a lower floor affords greater chance of safety, it is folly to remain in the open out of curiosity or bravado.

"The following advice is founded on the experience of recent raids :—

"As soon as it is clear that a raid is proceeding take the best available cover near at hand by entering the nearest building. Do not wait for the explosion of bombs, as one never knows where the next one may fall.

The index is immediately set at the number of degrees of the sighting angle, *i.e.*,  $10^{\circ}$ . The observer is ready to operate. About 2 or 3 kilometres before flying over the object the latter is caught in the field of vision, then in the circle of the bubble. At this instant the route corrector operates, and the galvanometer indicates to the pilot whether he is following a

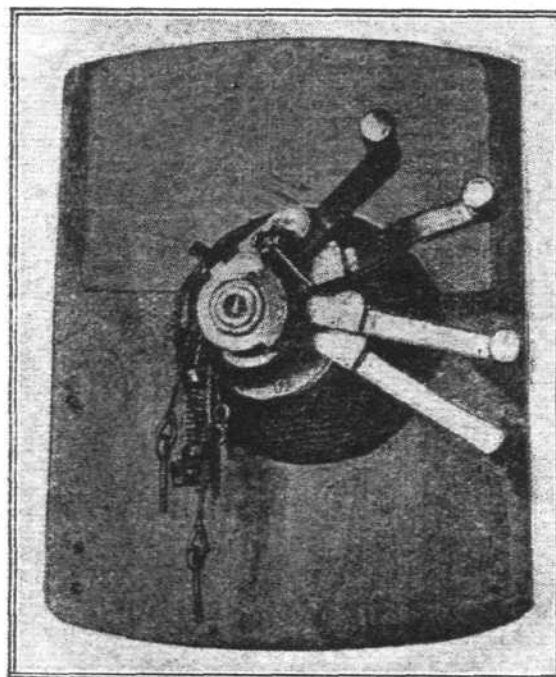


Fig. 9.—Device for releasing bombs.

route which will make the avion pass directly above the object. At the precise moment when the index fixed at the number of degrees of the sighting angle falls into the notch\* at the dead point—*i.e.*, at the moment when the finder aims with an angle of  $10^{\circ}$ —the bombardier operates the bomb releaser and the bombs fall towards the object.

Throughout the whole bombardment the pilot must keep his craft strictly head on to the wind; the air bubble must be kept rigorously in the centre of the ocular, the play of the prism alone serving to seek the object.

This Goerz range-finder is of an elementary simplicity for any one who has manipulated it in a few brisk actions. Its movable prism enables the object to be found with ease; its annular bubble permits it to be immediately centred in the vertical position. Marvellously constructed, it appears to show marked progress over all previously made range-finders.

It eliminates errors except from new and practically incalculable elements, such as variations of forces and directions of the wind between the altitude at which the sighting is done and the ground, or when it becomes impossible to keep the avion head on toward the wind. The aim being at times scientifically perfect as the application of a method derived from calculations, does it follow that the bombs will fall directly upon the objects aimed at? Results loudly proclaim a negative. Hundreds of bombs discharged on railway stations, on famous ironworks, on important aviation terrains, have been without result except for a few shell "funnels" in the ballasts, a few labourers killed, some holes in hangars. Range-finding is a delicate task to execute in an avion surrounded by bursting shells.

"A doorway or open archway, though some protection, is not good cover, as it does not give security from fragments of a bomb exploding on the ground or flying *débris*. It must also be remembered that injuries are sometimes caused by our own gunfire, and this can only be avoided by taking cover.

"If you are in a building on an upper floor, go downstairs in order to have the best available cover overhead. Avoid positions under skylights and do not look out of the windows, but keep where you will be out of the line of fragments of metal or *débris*, which may enter by a window or door if a bomb should explode outside."

#### Carpenters Wanted for R.F.C.

ACCORDING to the military representative at the Foleshill (Warwickshire) tribunal, 400 carpenters are required this month for the R.F.C.

# THE ROLL OF HONOUR.

REPORTED by the Admiralty:—

## Died of Wounds.

F 19467 Aircraftsmn., 1st Cl., H. A. Whitehouse, R.N.A.S.

## Accidentally Killed.

Prob. Flight Officer A. S. Coombe, R.N.  
Flight Sub-Lieut. J. E. Thomas, R.N.

## Accidentally Drowned.

Flight Sub-Lieut. M. S. Varden, R.N.

## Died of Injuries.

Prob. Flight Officer J. M. Dawson, R.N.

## Wounded.

Flight Sub-Lieut. G. E. C. Howard, R.N.

## Severely Wounded.

Flight Sub-Lieut. S. H. McCrudden, R.N.

## Accidentally Injured.

Ob. Sub-Lieut. G. H. Elliot, R.N.  
Flight Sub-Lieut. C. Saunders, R.N.

## Previously Missing, now Officially reported Prisoners.

Flight Sub-Lieut. B. J. W. Brady, R.N.  
Ob. Sub-Lieut. L. Marsh, R.N.

## Missing.

Ob. Sub-Lieut. H. Burns, R.N.  
Flight Sub-Lieut. W. E. Foster, R.N.  
Flight Sub-Lieut. N. D. Hall, R.N.  
Flight Sub-Lieut. G. B. G. Scott, R.N.

Reported by the War Office:—

## Killed.

2nd Lieut. G. J. Fogarty, R. Ir. R., attd. R.F.C.  
2nd Lieut. F. J. Foster, R.F.C.  
2nd Lieut. E. B. Greenhouse, R. Sco. Fus., attd. R.F.C.  
Capt. A. L. Macdonald, M.C., Bl. Watch, attd. R.F.C.  
2nd Lieut. F. J. A. Wodehouse, D. of Corn. L.I., attd. R.F.C.  
87713 2nd Air-Mech. F. A. Webb, R.F.C.

## Died.

2nd Lieut. F. C. Shapira, Aus. F.C.  
694 W. D. Sloane, Aus. F.C.

## Missing, believed Killed.

2nd Lieut. J. L. Bamford, R.F.C.

## Previously Missing, now reported Killed.

Lieut. H. D. Blackburn, R. Berks R., attd. R.F.C.  
2nd Lieut. W. G. T. Clifton, Oxf. and Bucks L.I., attd R.F.C.  
Lieut. W. L. Day, Bord. R., attd. R.F.C.  
2nd Lieut. R. R. Emmens, T.M.B.  
2nd Lieut. P. G. Harris, R. Welsh Fus., attd. R.F.C.

## Previously Missing, believed Killed, now reported Died of Wounds as a Prisoner in German hands.

2nd Lieut. V. H. Adams, R.F.C.

## Wounded.

2nd Lieut. C. W. Adkin, R.F.C.  
2nd Lieut. F. E. Barker, Yeo. and R.F.C.  
Lieut. H. H. W. Bean, R.F.C.  
Capt. J. M. Beaufort, A.S.C., attd. R.F.C.  
Lieut. A. G. Bill, Aus. F.C.  
2nd Lieut. O. C. Bridgeman, R.F.C.  
2nd Lieut. H. C. Dumbell, R.F.A. and R.F.C.  
2nd Lieut. J. B. Finch, R.F.C.  
2nd Lieut. H. A. Jones, Wilts. R., attd. R.F.C.  
2nd Lieut. A. W. Mackay, S.W. Bor., attd. R.F.C.  
2nd Lieut. R. S. G. MacLean, R.F.C.

2nd Lieut. W. E. Swann, R. Innis. F., attd. R.F.C.  
2nd Lieut. A. L. Taylor, A.S.C. and R.F.C.

Unless otherwise stated the following are Air-Mechanics, and the figure in brackets gives their rating: 15737 (1st) A. J. Allen; 44241 (2nd) R. G. Barker; 6509 (1st) G. A. Beardmore; 30163 (2nd) H. V. Bennetts; 8486 (2nd) C. V. Brooks; 8205 (1st) R. G. Collins; 22135 (2nd) H. Crossley; 65091 (2nd) F. D. Cusens; 44980 (2nd) H. V. Davies; 43692 (2nd) S. C. Davison, attd. R.G.A.; 12435 (2nd) P. V. K. Edsall; 10043 Sergt. S. W. Edwards; 87595 (2nd) H. Else; 56616 (2nd) F. J. C. Evans; 23672 (2nd) A. J. G. Ferguson; 9237 (1st) A. E. Giles; 10193 (1st) D. N. Griffiths; 18266 (2nd) W. J. S. Guile; 9216 (2nd) E. O. Gurney; 11845 (2nd) H. G. H. Hart; 50627 (2nd) C. W. Hasler; 7126 (1st) T. Haston; 7226 (1st) V. R. Henderson; 11732 (1st) R. J. Hibberd; 6774 (1st) T. Hodson; 12407 (2nd) A. G. Holmes; 44992 (2nd) C. Hubbard; 8418 (1st) J. Hughes; 9171 (2nd) E. T. Humphrey; 7463 (2nd) J. W. Kay; 11580 (2nd) L. G. Kemp; 45221 (2nd) H. Kirwin; 9972 (2nd) S. C. Lavell; 65250 Corpl. S. A. Mee; 62935 (2nd) B. T. Morse; 6388 Flight-Sergt. L. North; 18395 Actg.-Sergt. E. H. Olah; 61123 (3rd) E. Palmer; 67976 (2nd) R. Parkin; 44748 (2nd) R. Phillips; 10605 (1st) S. Prosser; 801 (1st) R. J. Robinson; 44246 (2nd) H. V. Rowlett; 48553 (2nd) J. E. Rutherford; 43575 (2nd) S. T. Sharp; 52416 (2nd) F. A. Shewan; 20037 (1st) G. A. Sims; 14226 Corpl. J. Stone; 9559 (1st) H. Taylor; 65074 (2nd) W. R. Taylor, attd. R.G.A.; 55957 (2nd) A. B. Thompson; 9747 (1st) J. Towers; 8977 (1st) A. R. Venn; 77615 (2nd) A. C. Watson; 13922 (1st) A. J. Weatherill; 43403 (2nd) D. A. Webley; 5084 (1st) J. G. Weldon; 9223 (1st) N. Wilson, attd. R.A.; 8687 (1st) H. Woollin; 13251 (2nd) A. W. Young.

## Previously reported Prisoners, now reported Wounded and Prisoners in German hands.

2nd Lieut. L. G. Bacon, R.F.C.  
2nd Lieut. G. M. Robertson, High. L.I. and R.F.C.

## Missing.

Capt. J. S. de L. Bush, Som. L.I., attd. R.F.C.  
2nd Lieut. H. G. Tambling, R.F.C.  
2nd Lieut. J. G. White, Sco. Rif. and R.F.C.  
2nd Lieut. L. Wigley, R.F.C.  
2nd Lieut. C. P. Williams, R.F.C.  
2758 Sergt. A. E. Parry.  
27234 Corpl. W. S. Wickham.

## Previously Missing, now reported Prisoners in German hands.

Capt. G. H. Cock, M.C., R.F.C.  
2nd Lieut. J. C. Griffith, R.F.C.  
Lieut. W. E. Grosset, Cyc. Bn. and R.F.C.  
2nd Lieut. H. Harris, R.F.C.  
2nd Lieut. H. M. Lewis, Welsh R., attd. R.F.C.  
Lieut. C. G. Mathew, R.F.C.  
Lieut. D. C. G. Murray, R.E. and R.F.C.  
2nd Lieut. G. H. Palmer, R.F.C.  
2nd Lieut. A. J. Savory, Yeo. and R.F.C.  
2nd Lieut. W. A. Strickland, Mx. R., attd. R.F.C.  
2nd Lieut. T. M. Sturgess, R.F.C.  
2nd Lieut. R. Trattles, R.F.C.  
Lieut. F. E. Vipond, Manch. and R.F.C.  
Capt. F. W. Winterbotham, Yeo. and R.F.C.  
78758 2nd Air-Mech. C. Lloyd.

## Previously Missing, now reported Prisoner in Bulgarian hands.

Capt. J. E. A. O'Dwyer, Sher. For., attd. R.F.C.



## Back from Germany.

AMONG the thirty-seven wounded officers who arrived home from Germany, via Switzerland, on Tuesday, were six belonging to the Royal Flying Corps. The officers have been taken to Millbank Military Hospital. Their names are as follows:—

Name.	Reported missing.
Lieut. A. W. Brown, 3rd Man. R., att. R.F.C.	Nov., 1915
Lieut. J. H. Firstbrook, R.F.C.	.. .. July, 1916
Lieut. H. M. Goode, R.F.C.	.. .. July, 1915
Sec. Lieut. F. N. Grimwade, R.F.C.	.. .. April, 1916
Sec. Lieut. C. W. P. Selby, 1st R. W. Kent R., att. R.F.C.	.. .. April, 1916
Capt. F. J. C. Wilson, R.F.C.	.. .. Sept., 1915

## German Attacks on Hospitals.

"LAST night the Germans made another air attack on the military hospital at Vadelaincourt, aiming especially at a

shed which was occupied by severely wounded cases from the battle at Verdun," says Reuter's correspondent at the French Army Headquarters, on September 6th. "The attack began at 10.30 p.m., and was kept up until 3 a.m. the aeroplanes flying over the sheds and dropping bombs every twenty or thirty minutes. Nineteen inmates of the hospital and dependent buildings were killed and 26 wounded.

"During the past month 100 persons, including seven women, have been killed or wounded by the German air raid in this hospital alone."

On the following day it was reported that the St. Lo and Harvard Hospitals of the United States, which are situated near a little coastal village had been bombed. One of the officers of the U.S. Army Medical Corps was killed and three others severely wounded, while two other persons were killed and 16 wounded.



# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## Club House.

The following prices have been fixed for the present by the Committee:—

Bedroom (including Bath)	..	5s. each per night.
Breakfast .. ..	..	2s. 6d.
House Luncheon ..	..	2s. 6d.
House Dinner .. ..	..	3s. 6d.

## Billiard Room.

The Billiard Room is now open for the use of the Members.

## THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W. 1.

## Subscriptions. £ s. d

Total subscriptions received to Sept. 5th, 1917 .. 11,900 12 11

G. H. Mansfield, Managing Director of the Aircraft Supplies Co., Ltd., 17, John Street, Theobald's Road, W.C.; proceeds of the sale of copies of "Standard A.G.S. Parts for Aircraft," by Bernard Isaac. (Sixth contribution, making a total of £24 10s. 10d.) .. .. . 3 7 10

Total, September 11th, 1917 .. .. 11,904 0 9

H. E. PERRIN, Secretary.

3, Clifford Street, New Bond Street, W. 1.

## FATAL ACCIDENTS.

A VERDICT of "Accidental Death" was returned at an inquest at Worthing on September 4th on 2nd Lieut. T. C. Kinkead, R.F.C., who was killed while making his second solo flight on September 3rd. 2nd Lieut. Kinkead, who was stated to have exhibited splendid control over the machine, came down in a spiral from a height of 2,000 ft. to 3,000 ft., next made a series of steep vertical banks for another 1,000 ft., and then straightened out again, apparently with the view of returning home. Unfortunately the engine failed to respond immediately. The throttle was opened again, having become cold during the long descent, and at a height of 250 ft. the pilot appeared to stall the machine for the purpose of reaching a favourable landing, with the result that the machine lost its flying power and nose-dived.

2nd Lieut. C. S. Hinchliff, R.F.C., was flying over a Lincolnshire rural district on September 5th when he apparently lost control over his aeroplane, which dived to earth. When assistance arrived it was found that the pilot had been so severely injured that death was probably instantaneous.

Lieut. Barry Dowling, R.F.C., was killed while flying in Scotland on September 5th.

At the inquest on September 5th on Flight Sub-Lieut. J. E. Thomas, who was killed in a flying accident near Yeovil on September 3rd, Sqdn. Comdr. Evill, D.S.C., R.N., said that in his opinion the accident was due to the pilot's over-confidence in the machine. He had been used to handling more powerful machines, which would stand more trick flying than the one he was using. The accident was caused by a little lack of caution while at too low an altitude. An engine mechanic stated that there was some trouble in starting the engine, but the engine was running all right when Mr. Thomas went away. The witness said he had never run one of these

engines before. He did not like the engine. The jury returned a verdict of "Accidental Death," adding a rider that officers should not be called upon to fly machines the engines of which they did not know.

While flying in the Grantham district on September 6th Flight-Sergt. G. Dunville was killed.

While flying in Wiltshire on the evening of September 6th Pilot-Cadet A. Vinogradoff, of the Russian Army, attached to the R.F.C., was killed.

Flight-Lieut. Coombe was killed on September 7th through the machine in which he was flying with Prob. Flight Officer Saunders falling into the Chingford Reservoir.

A verdict of "Accidental Death" was returned at the inquest at Shoreham on September 7th on 2nd Lieut. V. S. Edmunds, who was killed on his third flight alone by his machine side-slipping and falling to earth. A flying officer said the accident was due to a pure error of judgment, through lack of experience which could only be gained by actual flying.

An inquest was held in West London on September 7th on 2nd Lieut. L. H. Aston, R.F.C., who was killed in a practice flight on the morning of the previous day. Evidence was given to the effect that the machine in which Lieut. Aston went up was in perfect condition. A fellow officer stated that he noticed that Lieut. Aston rose too high in far too short a time. He lost flying speed, and had a side-slip. The machine then nose-dived to earth. Death was instantaneous. The jury returned a verdict of "Accidental Death."

The death has occurred in hospital on the North-East Coast of Prob. Flight Officer J. M. Dawson as the result of injuries sustained through a fall whilst flying on September 7th.

## Firemen's Work in Raids.

THE following Volunteer and members of the London Fire Brigade have been commended for assisting to save life at the scene of an explosion caused by bombs dropped from enemy aircraft on July 7th: James Benedictus, London Volunteer Rifles; Firemen A. P. E. Witt (sub-officer), J. W. Patterson, T. J. Lloyd, E. E. Brewer and T. Forrow.

## A Compendium of Aerology.

IN the midst of revolutions and wars, the Editorial Committee of the General Physical Observatory of Petrograd have managed to publish an important volume pertaining to aeronautics in the shape of a "compendium of aerology and synoptical meteorology for aviators and aeronauts." The book was undertaken with a view to co-ordinating and bringing within the compass of one volume as much as

possible of the information which has been secured by research in various parts of the world. It is hoped that it will not only prove useful in its present form, but that it will be the nucleus of a standard work on the subject. Some idea of the scope of the book can be gathered from the subjects treated, which include meteorological changes, &c., anemometers, air currents, atmospheric disturbances, temperature, moisture and fog, clouds, weather science, temperature in various atmospheric strata, acoustic phenomena, contour of the earth and its effect on air currents, &c. The fact that it is in Russian will doubtless restrict its utility for the present, but, possibly, when happier times prevail, if not before, its translation will be undertaken. In the meantime, it is published by the General Physical Observatory at Petrograd, but the price is not stated.



# THE QUESTION OF FABRIC.

By AEROMOT.

No doubt the future—and before very long—will answer this question in the fashion of the little boy who replied "There ain't goin' ter be no core." Sheet metal will replace the present costly and far from ideal fabric, and possibly before the war ends. This, of course, is to assume a good many things: first, a sufficiently light, yet tough and ductile metal; secondly, an appropriate surface for the same; thirdly, a way of attaching it to the plane structure other than riveting, in such fashion that it shall preserve all the appropriate curvatures, without any flats or lumps; and, fourthly, a much higher standard of motive power. Still, as it may equally be assumed that aero-scientists are all aware of each essential condition—postulate to the achievement of the all-metal plane, and are projecting how to get it, one may feel confident that sooner or later it—or rather they—will all be satisfactorily attained.

Meanwhile, the aerial end of the war—the bigger one—is still very much to be won. We may well overcome the alleged timber-supply difficulty by substituting metallic framing, struts, *longerons*, and all the rest of it. But there still remains the most important aerofoil material, and nothing better immediately apparent than the present linen fabric. One cannot see the best of veneers, applied with the utmost skill of even a Saunders, filling the requirements and withstanding the rigours of field service.

So the first thing is to abolish the pedantry of official prescription of so many ounces to the square foot, and of bursting and tensility strain-tests, when the tearing strain—and the resistance thereto offered by any given fabric—is all that matters—and then we shall be able to see what else is really available.

Apparently, everybody interested in the subject hitherto, has been obsessed with the oilskin or mackintosh idea; and so has tried after something with the least porosity; all to the wastage of much good yet unnecessary "dope," the weight of which has been added to that of the original fabric; positively to make it sag before its time. Whereas any duly qualified A.R.A. or other scene-painter would have told them that much less paint is required to cover coarse canvas than smooth copper or glass. Any sailing-man, too, would have said that the only reason he has for preferring union silk is that it is so very much lighter than linen or cotton canvas; not because it holds the wind any better. If one carries the principle to extremes, too, the familiar experiment of boring holes in the blade of an oar, shows that porosity *per se*—by some paradox hitherto unexplained—makes but little difference to the retention of fluids.

But strength—as everyone who gives the matter a moment's thought will agree—apart from the initial resistance of the individual fibre, is first and last, a question of weave. Yet the thickness of the said fibre—our true unit in this consideration—is a fixed quantity. Therefore, we come to this; that fineness, *i.e.*, non-porosity, other conditions being equal, is really inimical to strength! And not so much to bursting or tensile strength, but to resistance to tearing, the very kind of strength which is most essential to preserve. Those "long counts," for which Lancashire and Belfast are famous, and can only be imitated in Japan, exist as such, because the humidity of the climate in all three, alone permits the fewer fibres to adhere to make a finer consistent thread, strand or yarn; the more of which go to the inch width or breadth; hence the "long count."

Now, it is obvious that the strength of any given thread—in the sense of its tensility or resistance to disruption strains, whether it be a 3-inch cable or but the hundredth of an inch—is derived from the twist and lay of it *solely*; and that the same amount of fibrous matter, laid out on the flat, would not possess a fraction of that degree of strength. Thus, the conclusion is that it is the strength of each thread, and not the number of them to the inch, that is the desideratum. Really, then, what we need—as the criterion of fabric selection—is the same amount of fibrous matter, weighing no more—twisted up into half the number of threads. Or a little more fibre, perhaps, so as to pack the threads as closely as before; as there is nothing in openness of its weave for its own sake. On the contrary, the best weave would be not an open matt-like one, like a homespun, but a twill, with a close twist and a perpetual diagonal thread running athwart the weft.

But again we come back to the individual fibre as the unit of strength. Other things being equal—that is to say, the natural strength of any given fibre per inch, as compared with any other fibre—the length of its staple is the most important factor of the resistance strength to tearing. Obviously, the

one with the longer staple will be the better—if both be of equal thickness—because a greater length of it will be solidly twisted up with the other component fibres of the thread; and all together will thus hold on longer. Thus, the finest cottons—such as Queensland and Papuan, Egyptian and West African, grown from Sea Island or like seed—if of similar fine texture, are notably considered of the highest value.

Here, incidentally, we come to a little-known point, which is, only to be ascertained by microscopic examination under a high-powered lens. This is that the fibre of cotton—and I believe also, flax—has a tiny filamentous mouth at each end; which enables it, especially under the influence of a humid atmosphere, to seize the next fibre to it, and thus unite into a continuous strand, the more readily. The fibre of wool, on the other hand, or of any animal product used in textile manufacture, has no such mouth; but the curl of it—in the wool-fibre at any rate—gives it the same mechanical advantage. Hence, the great value of merino wool, a fibre of which will usually pull out to twice or even three times its apparent length. But this, in working up, goes against length of staple. And so important is the latter quality considered on the one hand, and on the other, so do the merino strains tend to become inbred and lose both staple and "body," that to preserve both, the merino is frequently crossed on the longer, coarser Lincoln once, and the progeny bred back to the merino, as a "come-back."

On the contrary, most vegetable fibres have neither mouth nor any sort of natural curl. The most valuable of these, therefore, depend for their value on natural strength and length of staple in the first place, and, secondly, on fineness of texture. Of these, the best known are the sisal (an aloe fibre chiefly grown in the West Indies), the flanduty of Paraguay and Argentina, which is usually worked up into a coarse native lace; a less-known flax-like fibre which grows like a weed all over the River Plate littoral; and ramie, the fibre of the Chinese, Indian, or East African nettle.

Of all these, however, ramie is incomparably the finest for all textile purposes. Not only is its fibre the longest and strongest of any—its length being limited only by that of the nettle stalk—but even fire does not reduce it to ash; hence its use as the body of incandescent mantles after impregnation with rare earths. Nevertheless, it is as fine in texture as the best cotton, of which the longest fibre is but a little over an inch. No less absorbent, it can be dyed readily—if anything, better than silk, the finest floss of which its "filasse" mostly resembles—and what is more, has the property of dyeing fast more readily than any other fibre with the exception of silk or wool. In which connection, many people will remember the exquisite fabrics exhibited some years ago by the late Mrs. Hart, of Gerrard Street, W., in all textures from that of the finest lawn up to the thickness of No. 3 "ship's duck." Perfectly plastic, too—as much so as silk—these fabrics would not stretch nor warp under any conditions. Which, of course, would bespeak ramie as the ideal aeroplane-fabric fibre; especially since any variety of its nettle can be grown on practically any soil, and once planted, it is cut as a perennial crop like lucerne; under favourable conditions, twice a year.

But—the drawback to ramie fibre has hitherto been the invariable presence of "pectines," or pertinacious gums stored within minute cells between the fibrous layers. Chinese growers, with their endless supply of cheap labour, used to eliminate the greater bulk of these pectines, with tenfold macerations in water, and beating with mallets on wooden blocks; which sufficed for the purposes of the slower native looms; although, obviously, this treatment partially destroyed the best qualities of the fibre, including the staple-length. Nevertheless, the presence of even the residuum of these pectines made ramie unsuitable for high-speed weaving on any machinery such as is used for cotton or flax. So—especially in Germany—they were got rid of by alternate steepings in alkaline and acid solutions. Which treatment, of course, ruined the nature, and abstracted half the strength or more, of the fibre itself. Not only so, but it was almost impossible to produce samples of filasse of continuous quality, or the bulk up to sample.

Than this, there could be no more hopeless commercial disqualification; and, naturally, neither Manchester nor Belfast interests attempted anything to remove it. Yet the very cellular quality of the fibre that constituted the harbourage of the pectines, was the secret of its superb dyeing quality; and the pectines themselves made the finest of waterproof dressings!

About six years ago, however, Professor Salo Wöhle, of



Bloomsbury—who will be remembered by motorists as the discoverer of the Volanda motor spirit, a coal extract; and who, despite his failures in many other departments of research, happened to be probably the greatest botanical chemist of his age—discovered a method of breaking down these pectine cells by boiling the fibre in its rough, unbeaten state, in cauldrons, with a secret solution—that was neither acid nor alkaline—for several hours; then wringing the fibre dry of its moisture, and hanging it to dry finally on racks or lines in a dustless atmosphere.

What this substance, that formed the base of the solution—otherwise ordinary well-water—actually was, nobody ever knew. I can testify, however, that some part of it, at least, was procurable at an ordinary oil-shop. Also to the absolutely perfect quality of the resulting "filasse"; fine as silk, with its strength and length of fibre absolutely unimpaired. But the old gentleman, like so many of his race and time of life,

was, to say the least of it, a most difficult person; one to whom candour to the most trusted friends, was a quality unknown. For one thing, the mechanical peculiarity—absence of mouth—of the ramie fibre, he also preserved as a secret, until he had compromised rather more than the patience of his best friends. Always to him, money in hand came before demonstrations. However, if he be living still, he certainly possesses the secret of producing the perfect and unimpaired ramie filasse at half the cost of cotton, on a commercial basis; with the raw material so cheap and so enormously plentiful, as hardly to be worth shipment. Nevertheless, rather more than worth growing, if Professor Wöhle can be induced for any consideration to part with his secret before anyone else of half his attainments blunders upon it. It is certain that his compatriots did not get it before the war, or they would be using it now. For with its pectines absolutely eliminated, there is no difficulty about weaving ramie fibre in any quantity.

## "X" AIRCRAFT RAIDS.

In view of the decision of the Government not to allow details of places visited by enemy aircraft to be published, we are, as before, giving to each one an index number. Eventually, when details are available, we shall give the respective information under these index numbers, which will facilitate easy reference to each particular raid.

### "X" 73 Raid (September 5th-6th).

THE Field-Marshal Commanding-in-Chief, Home Forces, has issued the following communiqué:—

"September 6th, 12.15 a.m.

"Enemy aeroplanes in considerable number crossed the South-East Coast shortly before 11 p.m. and dropped bombs at a number of places. Some of the machines reached the London district, where bombs were dropped shortly before midnight. No report of casualties or damage has been received as yet."

"September 6th, 1.30 p.m.

"Enemy aeroplanes in considerable numbers crossed the South-East Coast over a wide area between 10.30 p.m. and 2 a.m.—last night. The raiders seemed to have travelled singly or in groups of from two to three machines, for which

reason it is difficult to estimate their numbers with accuracy, but it is possible that as many as 20 machines took part in the raid. By 11.20 p.m. it became evident that enemy aeroplanes were approaching London, and at 11.45 the first bombs were dropped in the London district. From this time until about 1 a.m. 40 bombs were dropped in the district. Bombs were also dropped at several places on the coast. The total casualties reported so far are: killed, 9; injured, 49. The material damage is not extensive. One enemy machine is reported to have been brought down in the sea off Sheerness."

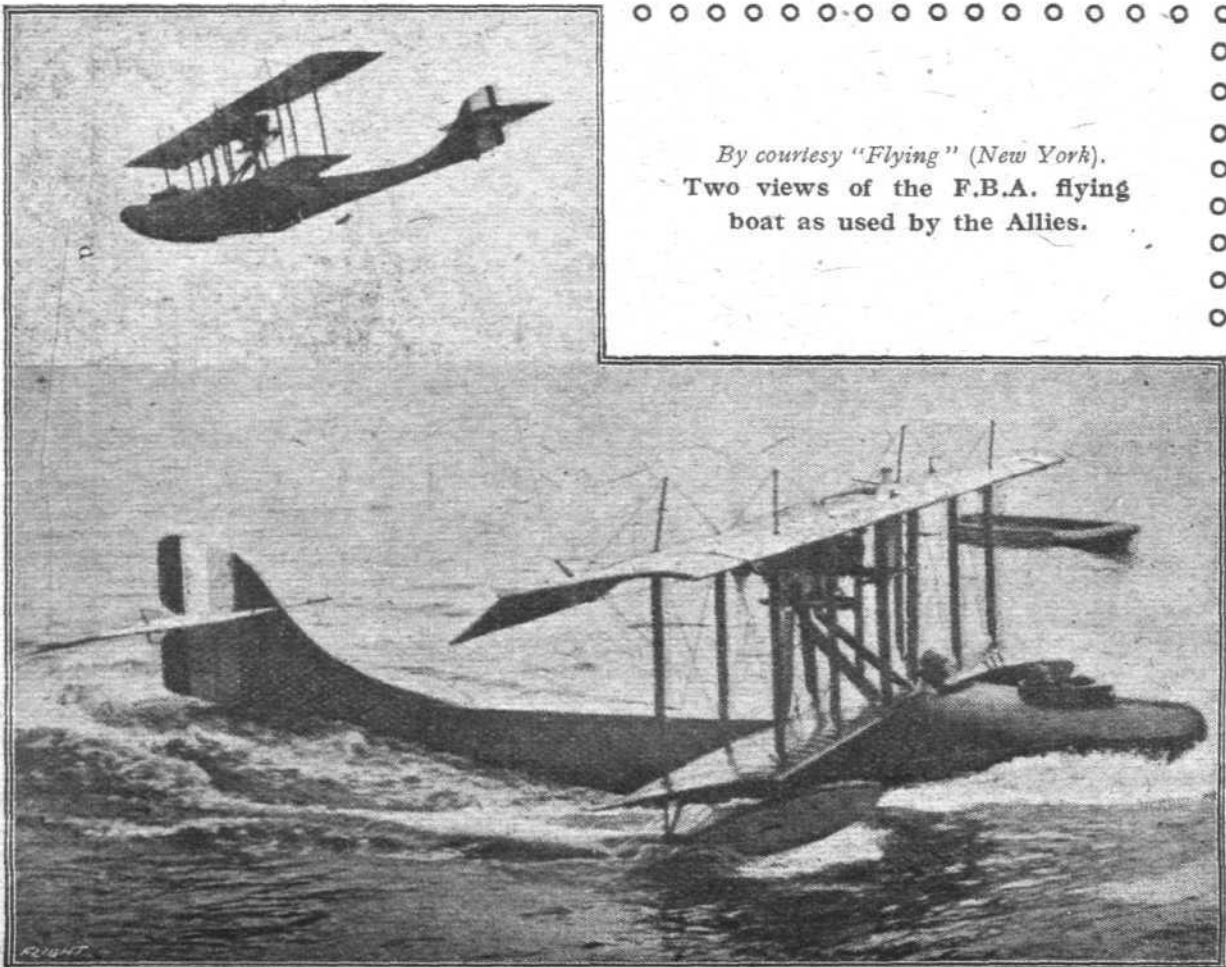
"Press Bureau, 5.10 p.m.

"We are authorised to state that the latest police reports show that there were 11 killed, 62 injured, in last night's raid."

### German Version.

"Berlin, September 6th."

"During the night of September 4th-5th our aeroplanes attacked London, Southend and Margate. The incendiary effect of the bombs dropped was observed. One of our aeroplanes has not returned."



By courtesy "Flying" (New York).  
Two views of the F.B.A. flying  
boat as used by the Allies.

# FROM OTHER LANDS.

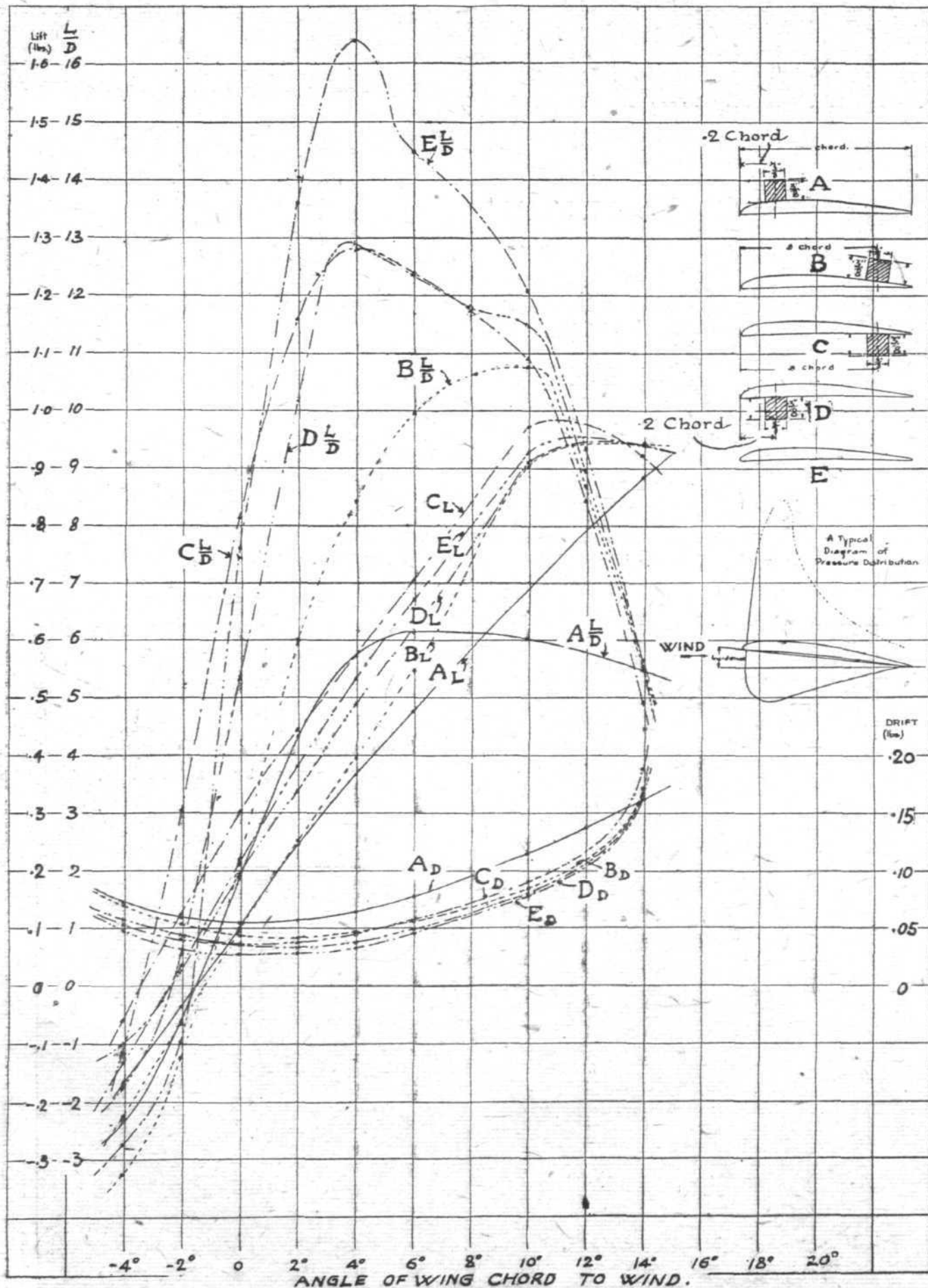
## DISTURBING BODIES ON WING SURFACES.

By ALEXANDER KLEMIN.

ON many recent examples of airplane construction we find disturbing bodies such as radiators and fuel tanks below and above the wings. It becomes important to determine where such obstructions shall be placed from an aerodynamical point of view, so that they will least affect the lift of a wing and impose least head resistance on a machine. Experi-

ments to determine these points were carried out at the Massachusetts Institute of Technology.

An R.A.F. 6 wing section was employed of chord 3 ins. and span 18 ins., with an obstruction of dimensions 2 ins.  $\times$   $\frac{3}{4}$  in.  $\times$   $\frac{3}{8}$  in., the tests being conducted at a wind speed of 30 m.p.h. If we imagine the wing to be  $\frac{1}{24}$  full size, the dimensions of



Curves showing effect of obstructions on wing surfaces.



the obstruction would be 4 ft. x 9 ins. x 9 ins., with a projected area to the wind of 3 ft., which would be roughly comparable with the dimensions of a honeycomb radiator. The tests were carried out with the centre of the block placed at one-fifth of the chord from the leading and trailing edges, on the upper and lower surfaces at the centre section of the wing.

As experiments at the National Physical Laboratory have shown, it is the centre section of a wing which develops the greatest lift and efficiency, both lift and L D falling off progressively towards the tip. If we consider also a typical pressure diagram as shown in the figure, the possibility of important losses becomes apparent. Since we are concerned with qualitative results only, the actual lifts and drifts on the model have been plotted in the curves. The lift in position A is considerably less throughout the working range of angles than in any other arrangement.

If we consider that the block is then placed at that point on the wing where the maximum suction pressure is developed, we can see that this loss in lift is to be reasonably expected. In other positions the loss in lift is not appreciable, and when as at C the block is placed on the lower side toward the rear trailing edge, the lift is actually increased; the obstruction apparently increases the pressure on the lower face, of course at the expense of some additional drift.

The drag and L D are poor for the combination A and B on the upper surface of the wing. D and C have smaller values of L D than the wing alone, but then the obstruction is a real one, which would produce drift wherever it was placed on the machine.

It is also noteworthy that the increase in drag of the combination C over the wing alone is so small. If the block were treated as a flat plate normal to the wind, with a coefficient  $K = .0028$  in lb. ft./sec. units, its resistance would amount to .0282 lb.

At  $0^\circ$  the drift of the wing alone is .0280 lb., that of combination A is .0540, or a difference of .0260, practically equivalent to the flat plate figure.

At the same angle the difference between the drag .0370 of combination C and the .0280 of the wing alone is only .0090. Something like 60 per cent. decrease in drag is therefore gained at small angles by placing the block at C as compared with the drag of the block placed either at A or anywhere else on the machine where it would not be sheltered by the wing. At bigger angles this gain would also maintain a high percentage.

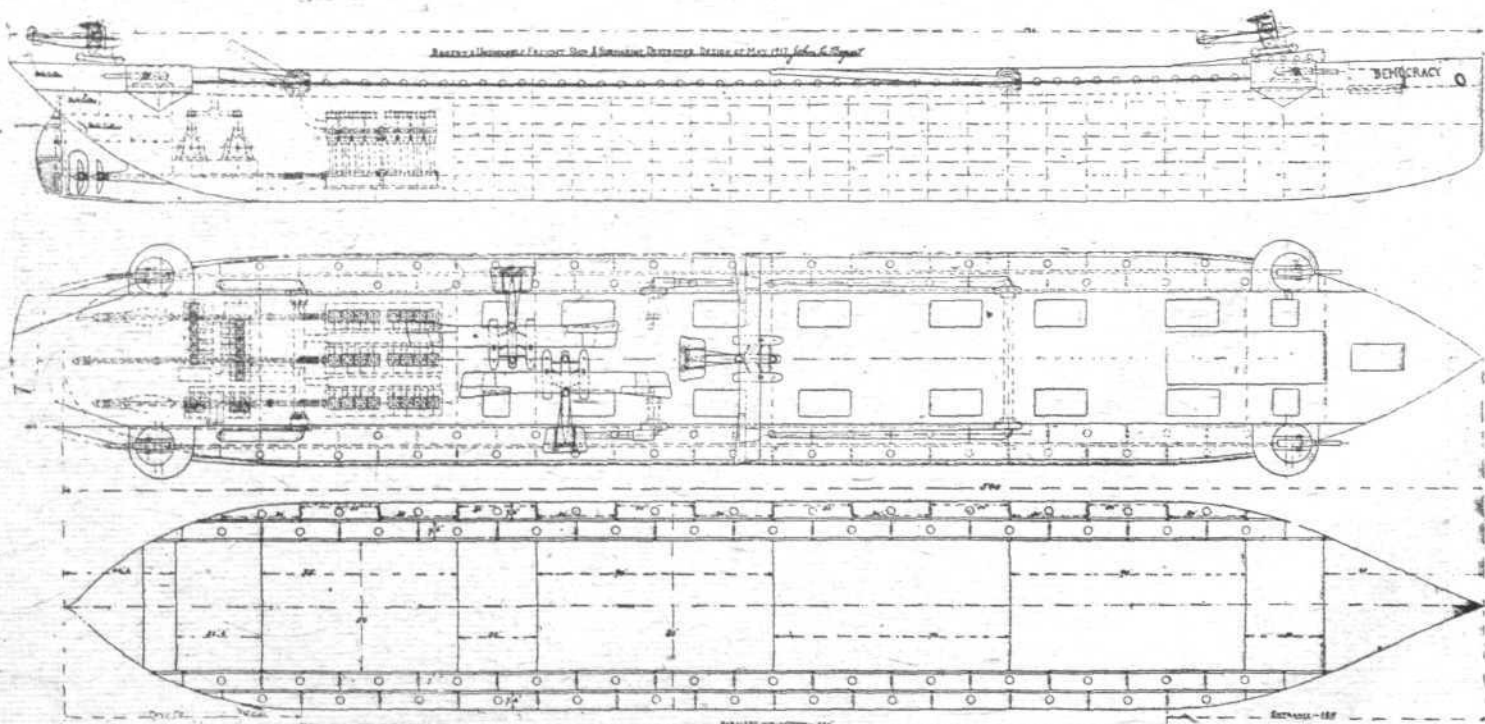
It would seem advantageous, therefore, to place an obstruction of this nature on the lower surface of the wing towards the trailing edge rather than anywhere else on the wing.—*"Aviation and Aeronautical Engineering."*

### AN UNSINKABLE MOTHER-SHIP FOR AEROPLANES.

THE following interesting description of a mother-ship for aeroplanes appears in our American contemporary *Aerial Age* :—

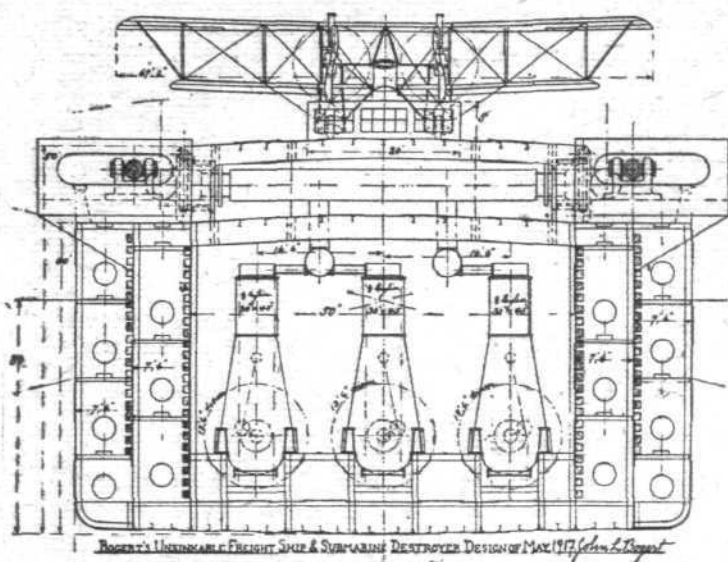
"The submarine has a deadly enemy—the aeroplane. For every poison there is an antidote seems to be a law of nature. The aeroplane can carry bombs capable of being set to explode either at contact with the water or so many feet under the water. The submarine under the water cannot see above the water, but the aeroplane, like a gigantic fish hawk, can and does see the shadow of the submarine many feet under the water, just as the bird sees the fish. The hawk swoops and dives, to reappear with the fish; the aeroplane swoops to a short distance above the long dark cigar shape shadow in the water, and lets drop bomb after bomb. Lucky the U-boat that escapes. She must either go down so far that not the faintest indication shows up from below, or come up and fight with such anti-aircraft guns as she may be possessed of. But what chance has she if not one but several aeroplanes are circling over her, and if an unsinkable ship is but a short distance away with three 6-in. rapid firing rifles trained on the spot where she must emerge? The U-boat that elects to attack has no chance. Now the questions. If an aeroplane can spot and bomb a submarine, why don't they go out to sea every day on this kind of work? Answer: An aeroplane has but a limited carrying capacity, even when constructed of the largest size, with immense area of wings

and great horse-power. When equipped with engines of nearly 300 h.p. the fuel consumption is some 30 gallons of gasoline per hour, and the fuel tanks rarely carry more than five hours' fuel at full power. Then, too, machine guns must be carried. So, though the lifting power of the machine may be over 5,000 lbs., it can only fly while it has fuel, and must return for fresh supplies every few hours. If the aeroplane can fly at the rate of 80 m.p.h., and the U-boats are operating 200 miles out from the coast, all the aeroplane can do is to go out, spend a short while looking round and then fly back. That is why the unsinkable 'mother'-ship is needed, some floating base of supplies, some sure landing stage and starting 'take off.' So a long vessel with a broad upper deck, free from all obstructions of any kind—no funnels, no masts, no cranes, no ordinary deck houses, no boats, no rafts, no wireless, no anything that might interfere with the alighting of the aeroplane or its launching. One of the original and clever features of this invention is the way in which these requirements are met. The boats, the cranes, the masts for signalling and wireless, are all stowed below the upper deck, the masts and cranes being turned round horizontal thwart-ship axes by electric motors geared with worm and worm wheel gearing. The same is true of the smoke-stacks, funnels and exhaust pipes. All ventilators project horizontally below the upper deck. The top of the pilot-house—for this ship can carry no navigator's bridge—is inclined aft, so



An unsinkable mother-ship for aeroplanes, suggested by Mr. John L. Borger.

that it makes an ideal 'take off' for the departing aeroplane. The ship is not short—shortness would not be an advantage to the alighting or departing aeroplanes. As shown in the cut, the overall length on the unobstructed upper deck is 560 ft. The upper deck is 50 ft. wide, and that is the width of the inner hull, but the cellular construction of the ship's sides bring the total width out to 80 ft. It is a question whether 74 ft. total width would not answer quite as well, which would mean a narrowing of the cells by 18 ins. The



**Cross-section of Mr. John L. Bogert's suggested mother-ship for aeroplanes.**

essential point in this unsinkable construction is that no diaphragm, partition or bulkhead, whether longitudinal or transverse, horizontal or vertical, reaches from the inner hull to the outer skin. They extend from the outer skin to the mid-skin or intermediate skin, and from the inner skin to the mid-skin or intermediate skin, but never from the outer skin to the inner skin. The reason is that a torpedo

exploding against the outer skin where a partition joins it would drive the partition inward and loosen its inner joints, so that they would no longer be watertight. The cut of a transverse section of the ship shows that longitudinal wooden stringers can be employed to catch the flying fragments of outer skin. Each cell then may be 30 ft. long, 7½ ft. wide and about 10 ft. deep. These cells are served by 3 to 4 ft. manholes, so that one might pass completely round the ship when in port and unloaded without coming out on the main deck. At sea all these manholes are clamped watertight by their covers, and the flooding of one does not mean the flooding of any other, provided the force of the explosion has not sheared the rivets and started the joints. Grain or coal might be the cargo carried in these sides. There is one point that has to be rather carefully considered. It is essential that the period of rolling for this vessel shall be as long and easy as possible—not stiff, short and jerky. Otherwise the upper deck would be an unsatisfactory landing stage. Ships without bilge keels whose beam is great in proportion to their depth have too great righting power when inclined, and their movements in waves are uneasy. There are two solutions of this problem: bilge keels and connected wing tanks with sufficient fluid shifting from starboard to port and from port to starboard to lengthen the period of roll. In the design and construction of these vessels all necessary precautions will be taken to keep the metacentric height within proper limits, and render the upper deck as stable a platform as possible.

"The motive power shown is the Diesel engine, but that is by no means the probable source of power that will be used in this country. It is much more likely that steam in the shape of geared turbines or triple-expansion engines will be selected by the powers that be, because we have done so little with the large Diesel engine here, we have too few men skilled in their manufacture or handling. In Europe, especially in Denmark or Holland, no difficulty would be experienced in getting suitable 4-cycle Diesel engines of ample power nor well-trained men to run them.

"Whatever the source of power, whether oil engine or steam, the funnels, smoke-stacks or exhaust pipes must make use of 'dipping' mechanism similar to that indicated in the illustrations; it must be possible to lower them out of the way of the aeroplanes whenever the latter are alighting on the deck."

#### **Aerial Mails in Mexico.**

It is stated from Mexico City that three regular aerial mail services are now in operation between that point and Vera Cruz, Queretaro and Pachuca, the time for the first being 4 hours, the second 2 hours, and the third 45 minutes.

#### **Aviators from Cuba for France.**

FROM Havana is announced by Col. Manuel Coronado, member of the Cuban Senate, the organisation of an aviation unit which will be offered to France with complete equipment.

Since the declaration of war against Germany on April 8th Cuba has been co-operating with the Allies in several ways, but it is probable that the Escadrille Cubaine, as the flying unit will be called, will be the first body of fighting men from Cuba to serve on French soil.

#### **Lufbery's Record Mounting.**

WITH the two enemy machines brought down on September 4th and 5th, 2nd Lieut. Lufbery, of the Lafayette squadron, has now destroyed 11 German machines. Among other distinctions, Lieut. Lufbery, it is stated, has received the British Military Medal.



**A flying-boat's-eye view of Jacksonville, U.S.A.**

*By courtesy, "Flying" (New York).*



## CORRESPONDENCE.

## Parachute Calculations.

[1941] Re your note on Parachute calculations. 2. The maximum safe velocity of fall was considered by Wenham and the older aeronauts to be about 22 ft. per sec. The shock on landing at this speed is equivalent to that felt by jumping off a wall  $7\frac{1}{2}$  ft. high (see my paper "On Parachutes," in the *Royal Engineer's Journal*, for April, 1891.).

3. I think myself that 19.6 ft., equivalent to the jump from a 6-ft. wall, is a better maximum value; while for ordinary work, a velocity of 16 ft., and height of wall = 4 ft., would appear to be suitable.

4. The calculations, for velocity, time, &c., are all given in the paper above referred to.

J. D. FULLERTON,  
Colonel, R.E. (retired).

Malvern, Sept. 9th.

## Parachutes.

[1942] As the invention of the Guardian Angel parachute will, no doubt, confer a boon on the coming race of aeronauts, it is difficult to see on what grounds intensive experiments by the authorities are any longer deferred.

It would appear that, up to date, more or less dilatory tests have been conducted under official supervision, that the official witnesses have expressed their admiration at the operation of the apparatus, raised certain objections to its official adoption, and have hitherto expressed themselves as not a little sceptical as to its unfailing practicability. In pre-war days the risks of air fighting were prospective, not actual, and the urgency of finding an antidote existed in an altogether lesser degree than it does at the present time.

It would be ridiculous to suggest that the Guardian Angel parachute is as perfect now as it will be in another 10 years' time, which is as much as to say that it differs in no wise from all other mechanical appliances, steam engines, motor cars, aeroplanes, &c., in so much that it is, like them, capable of improvement, but to defer its official acceptance for another 10 years would be admittedly absurd. The only question is, therefore, whether it has now reached a sufficiently practical stage to render its adoption desirable forthwith, taking into consideration prevailing conditions; and any one who has witnessed its performance, or the extremely interesting cinematograph representation of a large number of its demonstrations, will feel compelled to answer this question for themselves in the affirmative.

The entire apparatus bristles with ingenuity; every conceivable detail has received complete consideration, whilst the material and workmanship leave nothing to be desired. Indeed, so sound is the whole proposition that it inspires in any interested aviator sufficient confidence to make use of the apparatus without desire to witness a previous demonstration.

Our gallant flying officers should not any longer be required to pursue their hazardous duties without some means of escape from a burning or otherwise uncontrollable aeroplane.

Mr. Calthrop has for the last seven years (and, no doubt, at great expense) been perfecting his aerial life-saver, and has now, to all intents and purposes, efficiently solved the problem of folding a parachute into sufficiently small compass to render it attachable to any aeroplane, and all that remains is to familiarise the Air Services with this priceless invention. The best means of effecting this is to form a school of parachuting. The novelty of the idea at once arouses a suspicion of danger, but is it not merely the suspicion due to unfamiliarity? Were we not equally suspicious of the aeroplane? Was it not a few years ago considered suicidal madness to fly? Flying is now regarded as little more hazardous than motor racing, and it is an absolute certainty that parachuting will be regarded as a reasonably safe operation a few years hence, as soon as people are familiar with it, and come to realise that it is a safe way of escaping alive from a disabled aeroplane.

Possibly the fact that for years parachuting has been

relegated to a few professional performers, who earned an easy and lucrative living by it, may have biased public opinion as to its danger, and the lack of any apparent utility for this "stunt" has raised the present prejudice against its practice as part of an aviator's training, which it undoubtedly shortly will be. It is the case of looping the loop over again. Parachuting with scientifically devised parachutes is not dangerous. It is, in a sense, safer than flying itself, for the parachute is intermediate between the heavier-than-air and the lighter-than-air machines. The writer is of opinion that the risk entailed by 1,000 parachute descents from a bridge 500 ft. high is considerably less than that entailed by as many aeroplane ascents to and landings from the same height. The only possible danger in the parachute lies in its failure to open, and that is precisely what Mr. Calthrop's invention has entirely obviated. Not one of his parachutes has ever failed in this respect. It is true that the danger (if any) lies in the moment of disembarkation of the parachutist from the aeroplane, but just what these dangers will be under difficult conditions is the very work that a school of instruction and investigation would be in a position to ascertain by slow progressive means. Admitting even that accidents may occasionally occur, the percentage is likely to fall far short of the average number of accidents occurring daily in every aerodrome of importance throughout the kingdom. Flying has not been achieved without a heavy roll of honour, and flying is not a pursuit for the purpose of saving lives. Parachuting is essentially a life-saving business, and if it comes to have a roll of honour it will be one of honour, indeed—a few lives sacrificed to find the means of saving a host of others.

It is rather a pity that Mr. Calthrop should think fit to refer to the possibility of stunting in a parachute. It detracts from the essential utility of the proposition, and one cannot help thinking that he was not a witness of his friend's death, for no parachute could have saved the life of the Hon. C. S. Rolls. Apart from this, Mr. Calthrop's letter is full of the same well-considered interest which predominates throughout his invention.

If a few of the more experienced and older pilots would come forward and express their willingness to demonstrate these Guardian Angel parachutes, it would give an impetus to the craft, and inspire confidence in the younger and more active officers for whom it may be the means of saving many young lives, now being thrown away for the want of a safeguard. To fly without a parachute seems as criminally foolish as sending a boat to sea without lifebelts.

ANTARCTICUS.

[1943] I was very much interested in paragraph 4, "Parachutes for Airmen," of Editorial Comment in "FLIGHT," No. 453, dated August 30th, and should like to venture my views, although only from an amateur's point of view.

It is observed that as a very last resource the use of a parachute would be excellent for the means of saving a pilot's life; but another point contrary to that suggestion is that it is quite possible that, if the use of the parachute were introduced for airmen, the probability would be that an aviator would be tempted to use it in cases where he may apparently have lost control of the machine, and could by perseverance right it, to use the parachute as a means of saving his life and at the same time causing the loss of the machine. One often reads, especially in "FLIGHT," of cases where machines have so been righted after apparently being entirely out of control. Looking towards the other side of the question, the parachute could, no doubt, be used to great advantage under active service conditions, but even then there would have to be some very efficient device by which an airman could, from a fast-falling aeroplane, detach himself and land in safety. From my point of view the method of training pilots in the use of the parachute as a means of life-saving will be very difficult.

There is no doubt that the German airman referred to in the paragraph used this means of saving his life as the only alternative, being apparently absolutely overpowered by the superiority of the British pilot.

LEADING SEAMAN, R.N.V.R.

## A Gift from Toronto.

TORONTO City Council has decided to buy three aeroplanes for presentation to the Imperial Army Council.

## Nottingham's Gift to the Colonies.

A FUND to raise £2,000 has been initiated by the Nottingham Chamber of Commerce with a view to presenting an aeroplane to one of the Colonies—probably New Zealand—as a means of perpetuating the memory of Flight Comdr. Ball, R.F.C., who was a native of Nottingham.

## Austrian Rammed by an Italian.

DETAILS are given by the *Agenzia Stephano* of a dramatic duel over Bellona, between an Austrian Albatros and an Italian Nieuport, piloted by Flight-Sergt. Dellaro. When his machine gun became jammed, Dellaro, instead of taking advantage of the superior speed of his machine to withdraw from the fight, deliberately charged the Austrian machine, both coming down from a height of 9,000 ft. The Italian and Austrian airmen were buried together with military honours.

# THE DETERMINATION OF PARACHUTE VELOCITY.

By A. J. DE ZOYSA, A.M.I.C.E., Diploma C.E., &c.

I NOTE that several correspondents of your journal have asked for information regarding the rate of fall of a parachute. From the point of view of an airman escaping from a damaged airship, this point is of the greatest importance.

The following is not a complete and clear-cut theory. As a matter of fact, the influence of many agents—such as wind—that have an important bearing on the velocity of fall of a parachute has been purposely ignored, because such considerations would lead to mathematical refinements which, presumably, are beyond the scope of your journal. Further, this is only an attempt to determine the velocity of arrival of a parachute at the ground. I have appended such formulae as are useful to those who do not wish to wade through higher mathematics.

For practical purposes the vertical pressure on the curved top surface of a parachute is obtained by considering the pressure on its projection on a horizontal plane. Similarly the horizontal pressure is obtained by projecting the spherical surface on a vertical plane. So that, in general, the pressure in any direction is obtained by projecting the curved surface (parabolic or spherical) on to a plane perpendicular to the required direction, and then calculating the pressure on the projected area.

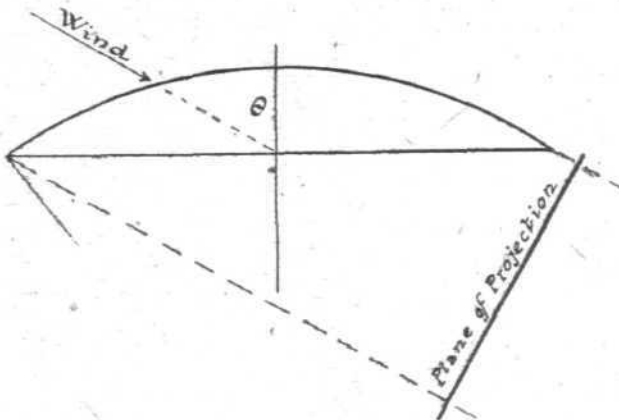


Fig. 1.

When  $\theta = 0$  (Fig. 1) the projected area would be circular. For other angles the area is elliptical.

When a body moves in air there is experienced a resistance to its motion which increases as the velocity increases. For bodies which move with velocities below 800 ft. per second the resistance is proportional to the square of the velocity. But in the case of motion of a pendulum, the velocity of which is small, the resistance seems to be proportional to the velocity. We shall, however, make the usual assumption that when a parachute falls the resistance is proportional to the square of the velocity, and that the total pressure is  $Z\rho V^2 A/g + P$ , where  $Z$  = a coefficient, varying slightly with the size of the surface,  $\rho$  = density of air,  $V$  = velocity of fall of the parachute,  $A$  = the area of projection of the parachute in a vertical direction, and  $P$  = the atmospheric pressure.

In the case of a parachute falling as it does under gravity in a resisting medium, the velocity will never exceed some definite quantity. Since the downward acceleration is

$g - Z\rho V^2 A/g$  there is no increase in velocity when  $g = Z\rho V^2 A$ ,

i.e., when the velocity =  $\left(\frac{g}{Z\rho A}\right)^{1/2}$ . This will then be the maximum velocity possible, and is called the terminal velocity.

Now, suppose the pilot descends from a height of  $h$  feet above the ground, the weight of parachute + pilot =  $mg$ , and the velocity at any instant is  $V$ , i.e., the resistance upwards is  $Z\rho V^2 A/g + P$ .

Consider the forces acting on the parachute. We have (Fig. 2) :—

1. A force acting downwards on the top of the parachute =  $P$ , the atmospheric pressure.
2. Weight of pilot + parachute.

## French Pilots for America.

FROM Paris it is reported that Sergt. Pilot Georges Carpentier, the boxer, who was recently said to have been

3. A force (resistance + atmospheric pressure) acting upwards. This equals  $Z\rho V^2 A/g + P$ .

When the parachute has fallen a distance  $x$  in time  $t$ , the equation of motion is

$$\frac{d^2x}{dt^2} = g - g \left( Z \frac{\rho}{mg} A \right) \left( \frac{dx}{dt} \right)^2$$

$$\therefore \frac{d^2x}{dt^2} + g \left( Z \frac{\rho}{mg} A \right) \left( \frac{dx}{dt} \right)^2 = g \quad (1)$$

The solution of this differential equation gives, if

$$Z \frac{\rho}{mg} A = \frac{1}{\kappa^2}, \quad \left( \frac{dx}{dt} \right)^2 = \kappa^2 \left( 1 - e^{-\frac{2gx}{\kappa^2}} \right)$$

So that, for practical purposes when the parachute reaches the ground, its velocity is given by  $\kappa$ ,

$$\text{but } \kappa = \sqrt{\frac{m}{Z \frac{\rho}{g} A}} \quad (2)$$

$$\therefore \text{Velocity at the ground} = \sqrt{\frac{m}{Z \frac{\rho}{g} A}}$$

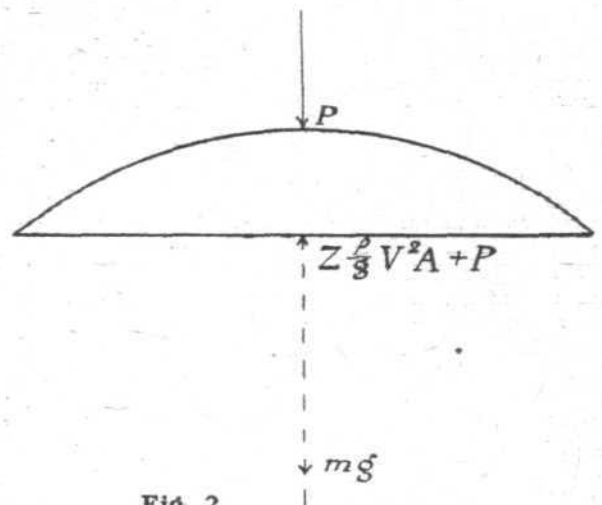


Fig. 2.

This formula holds when the height from which the parachute falls is not very large.

The integration of equation (1) gives

$$x = \frac{\kappa^2}{g} \log \cos h \frac{gt}{\kappa}$$

On arrival at the ground  $x = h$ .

$$\therefore h = \frac{\kappa^2}{g} \log \cos h \frac{gt}{\kappa}$$

$$\therefore \frac{gh}{\kappa^2} = \frac{gt}{\kappa} - \frac{gt}{\kappa}$$

$$\therefore \frac{gh}{\kappa^2} = \frac{gt}{\kappa} \text{ very approximately}$$

$$\therefore \kappa = \frac{h}{t} \quad \text{but } V = \kappa \quad (3)$$

$\therefore$  velocity of arrival =  $\frac{h}{t}$  where  $h$  is the distance from which the parachute fell and  $t$  = the time taken to fall. For instance, if the pilot took 5 minutes to descend from a height of 5,000 ft., then the velocity of arrival would be 16.7 ft. per second.

Equation (2) shows that the velocity of arrival is dependent on the weight and area of parachute. For instance, if the pilot and parachute weighed 160 lbs. and the area of the parachute was 600 sq. ft., then since the constant  $Z \frac{\rho}{g} = .0015$

the velocity would be  $\sqrt{\frac{160}{.0015 \times 600}} = 13.3$  ft. per sec.

It should be noticed that the correcting factor for these formulae is  $+.0002 V$ , so that the corrected velocity  $V$ , when  $V$  is the calculated velocity, =  $V + .0002 V$ .

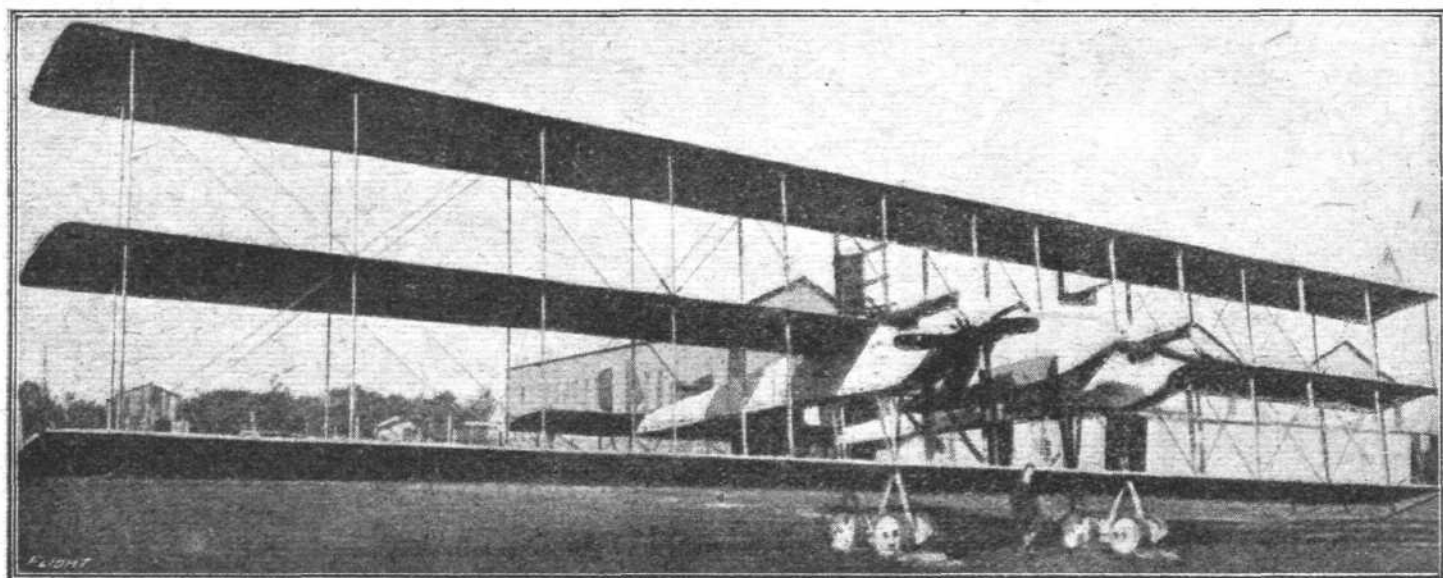
invalided out of the French Army, is being sent by the French Government as an instructor in aviation to the United States, where he will be stationed at Dayton, O. Navarre is also said to be going to the States as a pilot instructor.



# AIRISMS FROM THE FOUR WINDS.

It will be remembered that in the recently published report of the Advisory Committee for Aeronautics, it was stated that the investigations on the subject of aeroplane radiators had been brought to a conclusion, and recommendations made for standardisation. Effect has now been given to these conclusions by the Air Board, and a confidential

Furs for flyers is the prime object of a Newfoundland sealing steamer which has been specially despatched to Hudson Bay. A large stock of furs, it is hoped, will be secured and brought back before ice closes navigation in northern waters. A missionary ship which plies along the Labrador coast is further to collect furs gathered in the



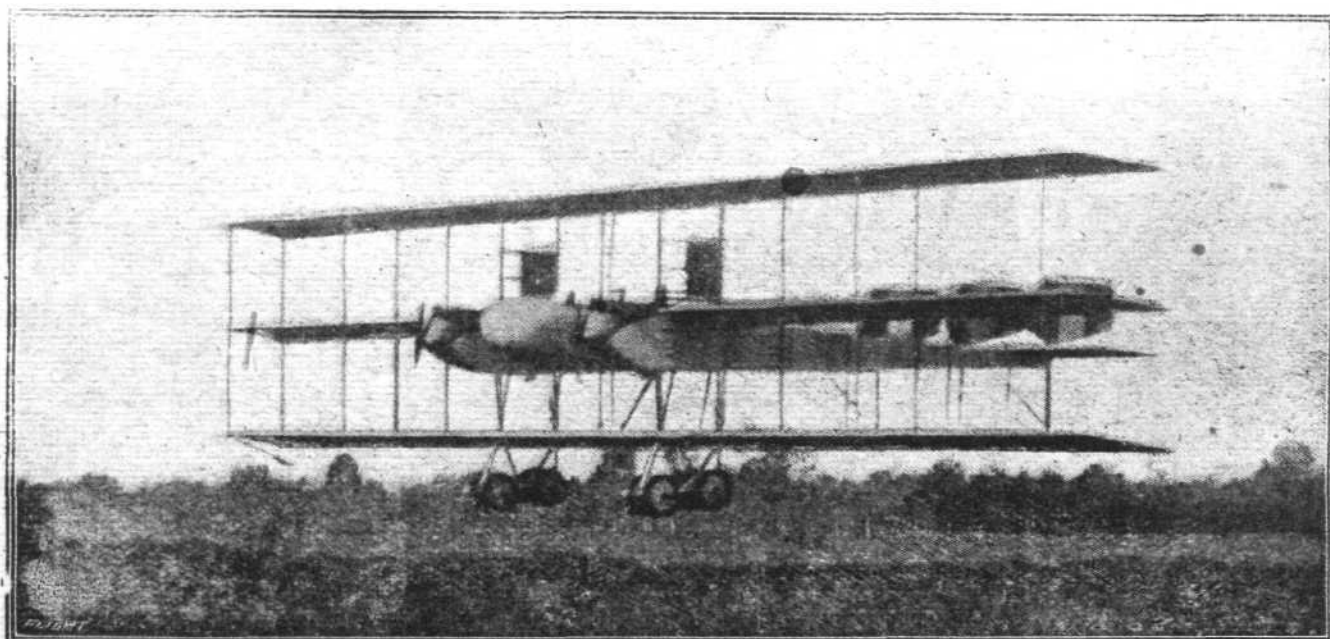
By courtesy "Flying" (New York).

**THE 600 H.P. ITALIAN CAPRONI TRIPLANE.**—This huge machine, the size of which may be judged by the man standing just in front, is equipped with three 200 h.p. engines, and has a speed of about 80 m.p.h.

circular letter has been issued to aeroplane contractors and radiator makers, instructing them as to the material which is to be used for this purpose, in future designs. As there may be some who are entitled to gain this information for the good of the country and who have not received the data, we would mention that enquiries on the subject should be addressed to the Department of Aeronautical Supplies, Room 609, Air Board Office, Strand, W.C.2.

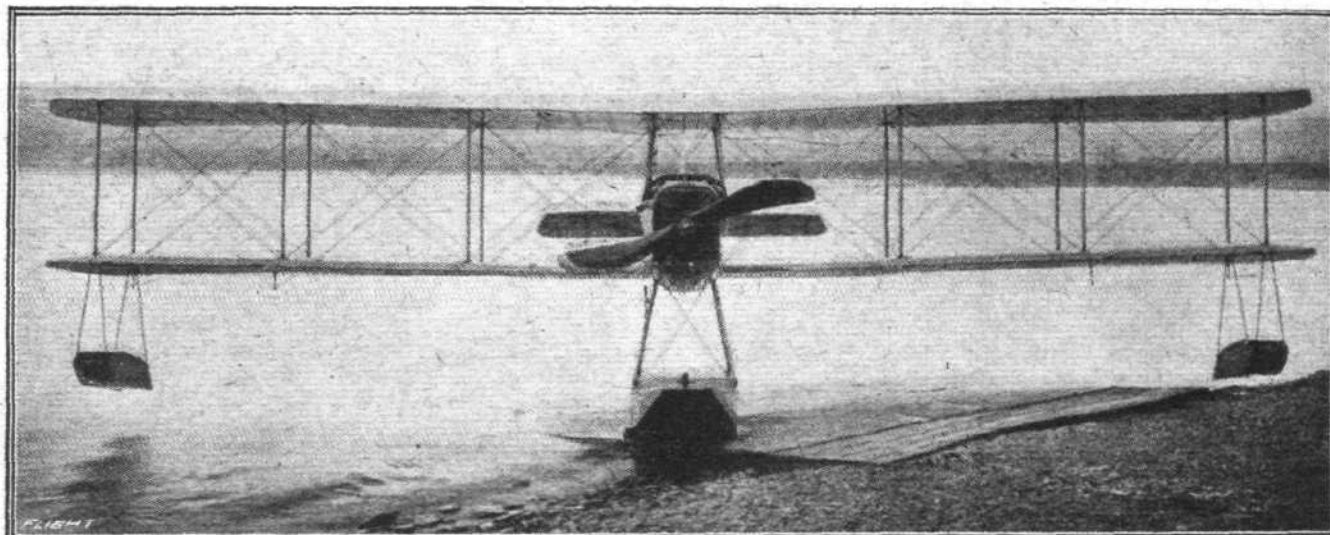
various missions posts there and bring them to St. John's. All of which is good hearing, but it gives us to think that there are views around that there is a 1918-19 war campaign to provide for.

A CHANCE offers for many a good man beyond military age to give a hand towards finishing the Huns, in a notice just issued by the Secretary of the War Office. The War Office



By courtesy "Flying" (New York).

Another view of the 600 h.p. Italian Caproni triplane, which has been doing such good raiding work on the Italian front. The machine is seen returning from a flight.



Front view of the Thomas SH-4 tractor seaplane.

points out that to keep the superiority which (thanks to the bravery of our airmen and the skilled organisation of the work of construction and repair at home and in the field) recent reports have so strongly demonstrated is held by the Allies, further great efforts are needed, and the Royal Flying Corps is therefore seeking men, skilled and unskilled, for its various branches. Men over age are not excluded from the Corps, which offers very interesting employment at special rates of pay.

ALL that need be done by anyone able and wishing to take a turn for the good of Civilisation is to get into communication without delay with the nearest Recruiting Officer, and he will explain the opening which offers so happily.

It only seems the other day when the news came of the death of Lord Lucas while flying over the German lines. Yet it was in November last that the announcement was made. Now comes another phase in the tragedy which deprived Britain of the services of so splendid a man, in the dispersal this week by auction of the remaining contents of the late Lord Lucas's beautiful country mansion at Wrest Park, near Flitton, Bedfordshire. His once magnificent home is now broken up. Its gilded furniture and decorations in the Louis XIV style, many fine pictures, including family prints and portraits, and thousands of books in their rich library bindings, this week lay chaotically about the rooms labelled for sale by the auctioneers. Misfortune after misfortune, says the *Daily Express*, has befallen the estate for some time past. In the spring of last year one of the greatest gales ever experienced swept down many of the magnificent trees which form avenues across the park. Then in the following September the mansion caught fire, and a considerable portion of the roof was destroyed. A month later came the news that Lord Lucas himself was missing. Despite

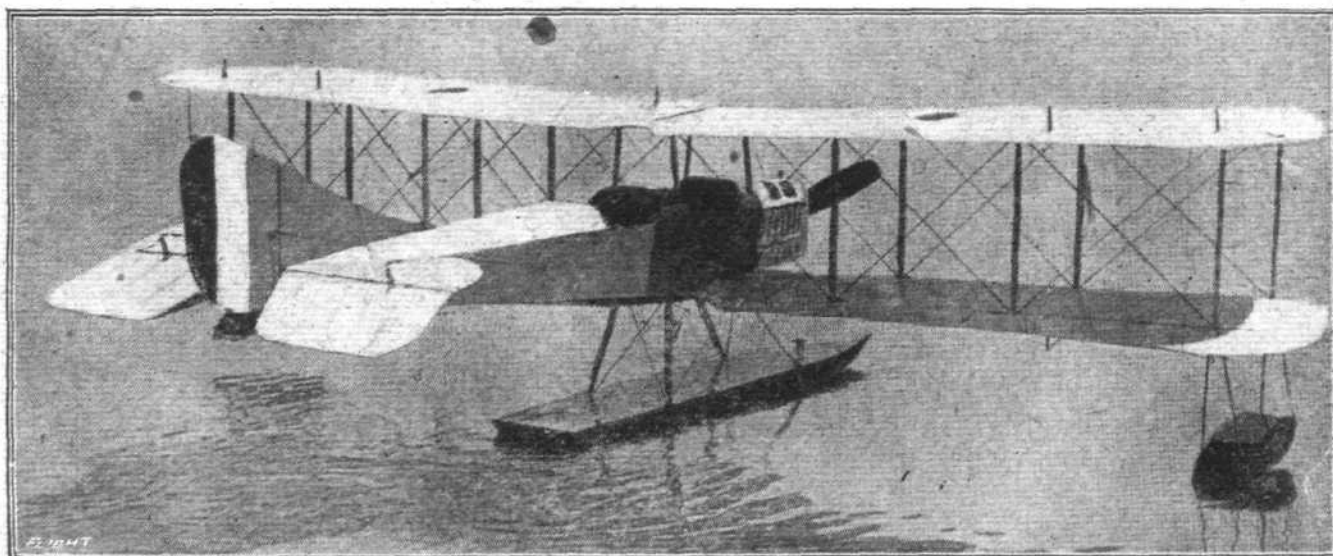
the fact that he had held high Government office, having for some time been Under-Secretary of State for War, he insisted on fighting for his country, and though suffering from a serious physical handicap entered the R.F.C., in which he met his death.

UNTIL the late Lord Lucas successfully claimed the title in 1907 there never was a Lord Lucas after the first. The title was always held by a woman or merged in a superior honour. As Lord Lucas died unmarried the barony has again descended to a woman—his sister, Miss Nan Herbert, who is an ardent Theosophist.

ONCE again has the counterpart of the "All Highest" been strafed from the air, this time by a flyer attached to Prussia's co-conspirator, Austria. During the last Austrian aeroplane raid on Venice one of the bombs dropped struck and slightly damaged the Morosini Palace, where the Kaiser has several times been a guest. Among the objects injured was a portrait of the Emperor, with an autograph inscription.

"FOR a thrilling second or two," so runs the account of an eye-witness, an English and a German aeroplane "were silhouetted across the face of the moon." This observer is clearly able, points out the presiding genius at the *Chronicle* "Office Window," to make accurate estimates of time in moments of excitement, a rare accomplishment, as the records of sworn testimony prove. At a distance of 12,000 ft. an 80 ft. long Gotha, seen broadside on, would just fall short of the apparent diameter of the lunar disc, and travelling at 70 m.p.h. it would traverse the face of the moon in one second.

ASSUMING the British airman was in close pursuit, it would only be a matter of "a thrilling second or two" for the two to pass right across the celestial searchlight, for Gothas



Three-quarter rear view of the Thomas SH-4 tractor seaplane.



waste no time when being hunted, and the probability is that both machines were doing nearer 100 m.p.h. than 70, which is a quiet amble for up-to-date flyers.

PETROGRAD is assuredly having enough variety in excitement just now, with the rapid and strange developments which are such a tragic aftermath of the revolution. As if these were not enough, the other day it is reported that the city experienced an air raid of an unexpected character. A Russian airman suddenly went raving mad, took up his machine, and peppered the place with bombs. Not much damage was done, but a mad bomb-dropping airman must be a funny customer to persuade to do the right thing.

A RAID story: An old gentleman from the country, tremulous with fear after hearing bombs and gunfire, emerged from his hotel with his wife. In the street they enquired of an imperturbable police constable if it was "all over." The policeman, imagining they were eager sightseers, said, "Well, I'm afraid, sir, it is all over; but they may return in 'alf an 'our." Rapid departure of old lady and gentleman.—(*Chronicle*, "Office Window.")

ANOTHER: H. H. Kohlsaat, the Chicago publisher, registered at — Hotel in London recently, and was assigned to a room on next to the top floor. The following morning he rang for a bell-boy. When there was no response to the second call he lifted the telephone receiver and waited in vain for "Are you there?" Failing to establish any communication with the office, he dressed and started for the office to register indignation. The elevator wasn't running. He began to walk down. On the fourth landing he met a housemaid, and asked, in strong Chicago language, what was the matter with the hotel.

"Well, sir, you see, sir," came the answer, "the aeroplanes were reported, and we were all ordered to the cellar for safety." "—— ———!" After which Mr. Kohlsaat said, "Well, I'm on the next to the top floor, and I wasn't warned." "No, sir," was the bland reply. "But you see, sir, you don't come under the Employers' Liability Act, sir."

"I HAVE only 30 bottles of spirits in the place," declared an off-licence holder in an East End suburb at closing time for the sale of spirits last week. The chief reason for his depleted stock was the increased demand for stimulants for consumption at home resulting from the air raids. Perhaps this is at the bottom of the reason for the raiding Huns bringing their own whisky against the time when they "invade" British soil. That they do add to their other iniquities this attempt to defraud the British Customs and Revenue was brought to light last week in a case against Mr. Harry Whatling Jun., of the Holly Tree Farm, Theberton, Suffolk, at Saxmundham Police Court for failing to report to the military or police the finding in a field of a bag dropped from the Zeppelin which was brought down on June 17th. The bag contained an electrical hand-lamp, a bottle of whisky, a cigarette case, a table-knife and some papers. For some reason or another the military evidence was heard in private.

COL. H. D'ARCH BRETON, R.E. (ret.), the Mayor of Rochester, enters a protest against the strafing of the authorities for neglect in stopping air-raids over this country. He writes: "I venture to deprecate the tendency to attribute the success of enemy air raids to the supposed supineness of the War Cabinet in the matter of the Army and Navy air services. The best defence is attack at the front, and a thousand defence planes would not have prevented the raids of September 3rd and 4th. It would be absurd to suppose that bombed French towns insist on the Government giving them local protection, or that bombed military hospitals complain against the military authorities. It should by now be recognised that the bombing of places behind the front line is always possible, and it will be wise for us to realise that aircraft have brought us nearer the front line than we ever were before, and that therefore we must now take our chances with the fighting men." Which is sound common sense, but it also points the obvious moral that, under the conditions, efficient defence measures are not unreasonably to be expected by those who have now become front liners.

APROPPOS the immunity of night raiders from successful attacks, Mr. W. Thorley, of New Malden, puts up a very good "counter" to the champions of everything being, under the conditions, in favour of the attackers, by reason of:

Defending aeroplanes find it very difficult to get into action against raiders.

Raiders, on the other hand, have no difficulty in getting out of the way of defenders.

Searchlights, although they can find aeroplanes, cannot hold them.

Anti-aircraft guns depend on the searchlights, and although they do what they can "their best is insufficient."

Is not the defence therefore, says Mr. Thorley, apparent, i.e., "that on the nights when the enemy visit this country our aeroplanes shall raid their nests, as the points enumerated above will apply equally to our raiders as to the enemy's, with the additional advantage that the enemy would not be certain whether the noise of the approaching engines would be that of their own aeroplanes returning or not until too late? This action would be in addition to independent raids at other times."

## TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT'S" precursor and sister journal) of September, 1907. "FLIGHT" was founded in 1908.

"LA VILLE DE PARIS."

After a somewhat lengthy absence, enforced by the unfortunate mishap which occurred during his trial ascent towards the end of last year, M. Henri Deutsch de la Meurthe's great airship, "La Ville de Paris," has once more taken the air. Rising to a height of some 200 to 250 metres, the airship proceeded to execute evolutions above the plain of Sartrouville for a period of about 50 minutes, after which it returned safely to earth. In the afternoon of the same day a second trial was carried out.

BRITAIN'S AERIAL NAVY.

A wave of satisfaction has doubtless passed over this country now that the Government has suddenly allowed it to "leak out" that it has in its possession a practically full-fledged military airship. The secret has not only been well kept up till now, but its disclosure has unquestionably come at a very opportune moment, for the great B.P. were getting not a little anxious at the apparent apathy of its State officials towards a type of machine which, if lighter than air, may nevertheless carry considerable weight in upsetting or maintaining the balance of power which now exists between the various nations. Knowing that England has an airship for military purposes, they will once more sleep in peace, and in the daytime read about the evolutions of the aerial war-ships abroad with a spice of thorough-going British condescension. It is, of course, just as well to kill alarm in its very earliest stages, as there is no mental disease which spreads quicker. It is true that this airship is, as yet, untried, and the men who are to handle it—and who will thereby form the nucleus of that trained aerial army, in which, as we have so often pointed out before, lies the real strength of the fleet—are at present untrained, but happily there appears to be little likelihood of much delay before trial trips will be made, for the airship is in an advanced state of construction, and almost any day may see it leave its shed, which is situated off the Swans Road, Aldershot, and sail gracefully off into the "central blue." Anyone who desires to witness the first or subsequent preliminary canterings will have to get up very early in the morning, for the Aldershot authorities in charge—and among whom the well-known names of Colonel Templar and Colonel Capper deserve particular recognition—are in no way desirous that their bird should be too closely inspected. At the present time the airship lies hidden behind two swinging doors, weighing something like 12½ tons apiece, and, moreover, the nearest window in the shed needs a very long ladder to reach it, so that it is far from open to anybody to satisfy their inquisitiveness even by stealth, let alone making a direct advance in the face of the sentries who guard all approaches. Everyone will admit that it is quite right to keep military secrets well hidden from the public gaze, and, until the Government see fit to divulge particulars in their own good time, the public must be content with the workings of their own imagination, or of the imaginations of those who provide them with daily news. What is of the greatest importance just at present is to know that activity reigns in the aeronautical section of the Aldershot camp, and that the deeds actually accomplished by France and Germany have not merely proved a considerable incentive to the staff of our own Army to push forward at high speed, but that they have been quietly carrying on this work over an extended period. If recent demonstrations in other lands have had any effect in giving the Aldershot authorities a freer hand in forcing the pace, popular exhibitions of the kind abroad are heartily to be welcomed, for, however much truth there may be in the frequently-repeated grumble against British inertia generally, there is, at least, no doubt as to the capability and resourcefulness of her military engineers and technical advisers.





# The British Air Service

"PER ARDUA AD ASTRA"



UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

## Royal Naval Air Service.

Admiralty, September 5th.

The following Prob. Flight Officers (Temp.) have been promoted to rank of Flight Sub-Lieut. (Temp.): D. S. May, S. G. Smith, W. Johnston, W. R. Tapper, A. G. Beattie, W. J. Burnett, D. K. Glen, C. G. Lee, S. Harlow, C. E. V. Wilkins, W. H. Sneath, J. R. Pattison, B. G. H. Keymer, L. J. Dunham, A. S. Readwin, W. B. Woodland, J. E. Watkins, S. K. F. P. Humphrey, C. W. Capes, L. G. Galloway, R. P. Salter, A. E. Webber, A. H. Paull, J. E. Pugh, G. W. Lavington, C. W. Lott, E. K. Green and V. F. Symondson.

The following have been entered as Prob. Flight Officers (Temp.): R. G. Collis (A.M., II), R. F. P. Sandford (A.M., I), H. L. V. Barnes (Sick Berth Attendant) and J. G. M. Mann (Sig., R.N.V.R.).

C.P.O. J. R. Dennett entered as Prob. Flight Officer.

J. L. Adams and R. Hall (both C.P.O., II) promoted to rank of Warrant Officer (Temp.), 2nd Grade.

H. Williams (Acting Warrant Tel., R.N.) entered as Warrant Officer 2nd Grade.

Admiralty, September 7th.

The following Prob. Flight Officers (Temp.) have been promoted to rank of Flight Sub-Lieut. (Temp.), seniority as stated: E. W. Desbarats and W. J. Beattie; June 10th. E. I. Russell and E. M. Knot; June 25th. G. A. Haydock and E. Burton; July 10th. M. J. B. Smith, W. M. Clapperton, R. G. MacAloney, J. E. S. Alexander, A. B. Massey, E. V. J. Grace, G. H. Boyce, H. H. Costain, N. G. Fraser and J. H. St. James; July 25th.

The following have been entered as Prob. Flight Officers (Temp.), seniority as stated: G. B. Anderson, F. J. Aksham, V. C. S. Bach, F. J. H. Bacon, T. N. Barling, L. G. Barnett, G. W. Cooper, J. B. Davies, F. H. Dawson, T. F. Everitt, J. Y. Feggetter, F. A. B. Gasson, K. C. L. Gorrings, J. H. Grierson, A. W. Hardwick, R. S. Hartree, B. A. Hewett, W. B. Hughes, W. D. Jeans, P. C. Jenner, C. B. Kempson, A. C. Kilburn, W. D. McKinnon, W. H. D. Manchee, T. H. May, J. H. Mesham, V. W. Morecroft, H. A. Myott, E. O'C. Parsons, L. H. Riddell, J. Robinson, G. P. Smith, W. Smith, A. L. Stephens, F. J. Sutherland, H. Tomlinson, W. H. Turner, E. C. G. Vines, E. E. Ward, J. H. Whitting, D. M. Wetherspoon, J. B. Blundell, D. W. Harrison, H. Harrison, S. G. Mawdsley and D. O'Flacherty.

The following have been entered as Prob. Flight Officers (Temp.), seniority as stated: E. S. Grinstead, H. Dixon, J. F. George, J. A. Radcliffe and T. R. Watson (Ch. Wr., R.N.V.R.); Sept. 2nd. S. Smith; Sept. 10th. F. I. Bradley; Sept. 17th. F. V. Chapman and T. L. Crouch; July 9th.

R. A. Coote and H. Bailey both granted temp. commissions as Lieut. (R.N.V.R.), seniority respectively Aug. 31st and Sept. 6th.

Admiralty, September 8th.

Temp. commands as Lieut. (R.N.V.R.) have been granted to the following, seniority Sept. 7th: F. D. Taylor, A. M. W. Wells, J. O. W. G. Chambers and L. F. Lambert.

Admiralty, September 10th.

Temp. Prob. Flight Officers J. O. Simpson and J. W. Simpson promoted to rank of Temp. Flight Sub-Lieut., seniority May 27th and July 31st respectively.

Temp. Lieut. (R.N.V.R.) A. L. Howarth and Sig. (R.N.V.R.) W. R. L. Jenkins entered as Temp. Prob. Ob. Officers, seniority Sept. 8th and 17th respectively.

W. M. Johnson granted a temp. commission as Lieut. (R.N.V.R.), seniority Sept. 8th, and A. A. Morris granted a temp. commission as Sub-Lieut. (R.N.V.R.), seniority Sept. 10th.

## Royal Flying Corps (Military Wing).

London Gazette Supplement, September 4th.

The following appointments are made:—

**Flying Officers.**—Lieut. A. Lang, S.R.; Aug. 26th, seniority Dec. 23rd, 1915. Temp. 2nd Lieut. (on prob.) C. J. Thomson, and to be confirmed in his rank; June 20th.

**General List.**—G. E. Martin to be Temp. 2nd Lieut. (on prob.); July 7th. **Memorandum.**—Bt. Lieut.-Col. (Temp. Brig.-Gen.) J. M. Salmond, C.M.G., D.S.O., R. Lanct. R., to be Temp. Major-Gen.; June 22nd (substituted for the notification in the Gazette of July 28th).

**Wing Commander.**—Lieut. (Temp. Major) R. A. Cooper, D.S.O., Yeo. (T.F.), from a Sqdn. Comdr., and to be Temp. Lieut.-Col. whilst so employed; Aug. 17th.

**Flying Officers.**—Temp. Lieut. T. W. E. Brogden, R. Ir. Rif., and to be transf'd. to R.F.C., Gen. List; July 8th. 2nd Lieut. (Temp. Lieut.) B. F. G. Cunliffe, Yeo. (T.F.), and to be sec'd.; Temp. 2nd Lieut. G. Carpenter, Gen. List; July 10th. Temp. Lieut. G. St. G. Stedall, Yeo. (T.F.), and to be sec'd.; July 11th. 2nd Lieut. (on prob.) A. C. Watson, S.R.; Temp. 2nd Lieut. K. A. McFadyen, att'd. Sea. Highrs., and to be transf'd. to R.F.C., Gen. List; July 12th. 2nd Lieut. S. R. Lesley, Yeo. (T.F.), and to be sec'd.; July 13th. Temp. 2nd Lieut. L. S. Worthing, Ches. R., and to be transf'd. to R.F.C., Gen. List; July 18th. Lieut. C. H. C. Woods, Can. A.S.C.; July 25th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: D. J. Weston; Aug. 12th. A. Thompson, A. V. Stupart; Aug. 14th. Temp. Lieut. R. T. Pagan, Gen. List, from a Flying Officer (Ob.), seniority Aug. 24th, 1916; Temp. Lieut. H. W. Soulbey, Gen. List, from a Flying Officer (Ob.), seniority Aug. 30th, 1916; Aug. 15th. 2nd Lieut. D. B. Richardson, York R., and to be sec'd.; Aug. 16th.

**Equipment Officers, 2nd Class.**—From the 3rd Cl., and to be Temp. Lieuts. whilst so employed: 2nd Lieut. H. G. Bell, S.R., June 12th; Temp. 2nd Lieut. T. J. Price, Gen. List; Aug. 21st.

### Schools of Instruction.

**Schools of Aerial Gunnery.**—The following appointments are made:—**Commandant (graded as a Wing Commander).**—Temp. Major A. R. C. Cooper, Gen. List, from a Chief Instr. (graded as a Sqdn. Comdr.), and to be Temp. Lieut.-Col. whilst so employed; Aug. 16th.

**Chief Instructor (graded as a Park Commander).**—Temp. Capt. H. Cockerell, Gen. List, from an Instr. (graded as an Equipment Officer, 1st Cl.), and to be Temp. Major whilst so employed; Aug. 16th.

**General List.**—Lieut. E. N. E. Waldron, from Ind. Army Res. of Officers, to be Temp. Lieut.; Aug. 18th. Temp. 2nd Lieut. C. H. Piper relinquishes his commission on account of physical unsuitability as a Pilot or Ob.; Sept. 6th. H. Stuart (late Lieut., Cyclist Bn.) to be Temp. 2nd Lieut. (on prob.) Aug. 24th.

**Supplementary to Regular Corps.**—2nd Lieut. (on prob.) P. G. Ashford is confirmed in his rank. The following to be 2nd Lieuts. (on prob.): G. Wallas; Mar. 2nd. T. R. Bloomfield; June 12th.

**General List (R.F.C.).**—Cadets to be Temp. 2nd Lieuts. (on prob.): J. E. Adam, J. G. Anderson, J. H. F. Baker, H. K. Baron, H. D. Barton, P. H. Bell, E. E. Bickard, J. J. Borrowman, F. J. Bravery, C. L. McH. Burton, C. H. Cahill, N. C. S. Campbell, M. A. K. Carpenter, S. de V. Clarke, W. H. Clarke, J. N. Clitheroe, C. E. G. Cooper, J. Cottle, D. S. Cramb, R. A. Curry, K. B. Davies, J. H. A. Deeper, I. C. Dick, A. W. Donald, M. E. Draper, N. B. Edwards, W. Fraquharson, I. W. T. Fraser, E. K. Fellowes, L. B. Gately, J. M. Goller, V. Gordon, W. R. Greathead, J. R. Harrington, F. St. P. Harran, W. S. Hay, H. G. Heather, A. S. Hemming, V. K. Hilton, O. F. D. Jackson, F. A. Jeppe, T. A. Johnson, A. D. R. Jones, V. W. Kilroe, J. F. P. Kirsten, H. H. Levin, A. O. Lewis-Roberts, J. R. H. Liddell, A. T. Lotz, F. W. Lowen, K. E. Martienssen, M. B. Massey-Hicks, J. W. S. Mellish, E. R. W. Millar, T. C. Moore, T. P. Morgan, W. R. Murray, G. E. Nicol, G. A. E. Norgarb, J. H. C. Norgarb, O. O'Connor, C. K. Oliver, M. T. S. Papenfus, C. C. Parrott, H. G. S. Phipson, G. B. Powell, T. Roberts, T. McI. Ross, V. C. Roxmouth, R. C. Sansom, G. R. Savage, J. D. Scott, S. H. Scott, G. B. Shermur, E. L. Smithers, F. H. Solomon, S. A. R. Solomon, A. R. Spurling, E. C. W. Steenberg, R. Sterling, A. Stevens, R. C. Stokes, R. G. Taggart, H. C. Tussaud, R. G. Turner, A. J. P. Wheeler, J. J. Yates, R. H. Yell; July 29th. W. T. Harries, V. C. Kirtley, C. G. Lloyd, W. J. B. Nel, G. T. Rodda, L. J. V. Staden; July 30th. R. B. Donald, A. H. Harris, J. L. King, F. W. Nelson; July 31st.

London Gazette Supplement, September 6th.

The following Warrant, N.C.Os. and men to be Temp. 2nd Lieuts. —**Royal Flying Corps.**—Spr. S. A. Oades, from R.E.; May 15th. 1st Cl. Air-Mech. H. M. Haines; May 17th. Sergt. H. S. Whitley, from R.A.M.C. (T.F.); L.-Corpl. W. Naylor, from R.E. (T.F.); L.-Corpl. F. H. R. Henwood, from Yeo. (T.F.). June 3rd. Sergt. A. Marriner; Sergt. E. L. Gresley-Cox, from Yeo. (T.F.); 2nd Cl. Air-Mech. R. A. Davey; 2nd Cl. Air-Mech. L. G. Candy, from S. Afr. R.F.C.; June 22nd. 1st Cl. Air-Mech. L. Hawkins; June 23rd. Sergt. W. J. Morgan; Corpl. R. S. M. Bruce, from Yeo. (T.F.); Pte. A. Eckley from Can. A.M.C.; June 25th. Flight-Sergt. F. Little; June 26th. Acting Coy. Q.-M.-Sergt. H. G. Freeman, from Yeo. (T.F.); 1st Cl. Air-Mech. C. F. Cotton; June 27th. Acting Coy. Sergt.-Major N. H. Kilby, from Yeo. (T.F.); Pte. R. J. P. Grebbly, from Yeo. (T.F.); July 3rd. Corpl. B. Benson; July 13th.

The following appointments are made:—

**Flight-Commanders.**—From Flying Officers: Capt. G. A. R. Spain, Ind. Army; July 1st. Temp. Capt. whilst so employed: Temp. Lieut. K. S. Henderson, Gen. List; July 10th. Lieut. D. Cloete, M.C., S.R.; July 20th. Capt. W. E. Birch, S. Lan. R. (T.F.); Aug. 8th. 2nd Lieut. (Temp. Lieut.) W. A. Shirlaw, High. L.I. (T.F.), and to be Temp. Capt. whilst so employed; Aug. 13th. Capt. H. S. Lees-Smith, S.R.; 2nd Lieut. C. C. Clark, R.A., and to be Temp. Capt. whilst so employed; Aug. 21st. 2nd Lieut. (Temp. Lieut.) W. V. T. Rooper, Yeo. (T.F.), and to be Temp. Capt. whilst so employed; Aug. 24th.

**Flying Officers.**—Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: J. Hunt; June 1st. R. W. B. Matthewson; Aug. 13th. R. S. Leventon; Aug. 14th. F. M. Wood; Aug. 15th. H. J. T. Wilkes; Temp. 2nd Lieut. W. A. Bartlett, Linc. R.; G. H. Whyte, G. A. Cawson; Aug. 16th. W. A. Rochelle, E. A. Cooke, N. Roberts; Aug. 17th. S. Canning, J. W. Templeman, I. U. MacMurchy; Aug. 18th. S. Jones; Aug. 20th.

**Balloon Commanders (graded as Balloon Officers).**—From Balloon Officers: Temp. Lieut. C. A. McConchie, Gen. List; Dec. 5th. Capt. A. H. C. Hope, Sea. Highrs. (T.F.); Aug. 13th. 2nd Lieut. R. S. Davey, R.F.A., S.R., and to be Temp. Lieut. whilst so employed; Aug. 14th. 2nd Lieut. (Temp. Capt.) H. A. Laycock, Durh. L.I. (T.F.); Aug. 20th. To be Temp. Lieuts. whilst so employed: Temp. 2nd Lieut. H. Olivier, Gen. List; 2nd Lieut. L. W. Thompson, Middx. R. (T.F.); Aug. 21st.

**Balloon Officers.**—Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: H. V. Williams; June 15th. A. J. Bird, A. S. Budge; June 29th. 2nd Lieut. W. H. Hargreaves, Middx. R., and to be sec'd.; July 17th. Temp. Lieut. M. D. C. Drummond, Glouc. R., and to be transf'd. to R.F.C., Gen. List; July 25th. A. Blair; July 26th. S. de Freitas; July 31st.

**Park Commander.**—Capt. H. B. T. Childs, S.R., from an Equipment Officer, 1st Cl., and to be Temp. Major whilst so employed; Aug. 25th.

**Special Appointment (graded as an Equipment Officer, 1st Class).**—Lieut. R. H. C. Usher, M.C., Wilts. R., S.R., from a Flying Officer and to be Temp. Capt. whilst so employed; Aug. 22nd.

**Equipment Officers, 2nd Class.**—And to be Temp. Lieuts. whilst so employed: Temp. 2nd Lieut. L. T. Beddow, Gen. List; Aug. 1st. 2nd Lieut. M. A. Chappell, S.R., from the 3rd Cl.; Aug. 20th.

**3rd Class.**—2nd Lieut. C. A. Le Strange, Yeo. (T.F.); May 21st. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: J. W. Saxon, H. B. Wilson, L. C. G. Gemson; Aug. 16th. D. McLellan; Aug. 17th.

**General List.**—Temp. 2nd Lieut. H. C. Maybury relinquishes his commission on account of physical unsuitability as a Pilot or Observer; Sept. 7th. To be Temp. 2nd Lieuts. (on prob.): L.-Corpl. F. W. G. Ticehurst, from Kent Vol. R.; Aug. 11th. E. Bagshaw; Aug. 13th. 2nd Lieut. F. R. Brighton, from Co. of Lond. Vol. Corps Aug. 24th.

### Schools of Aerial Gunnery.

**Chief Instructor (graded as a Squadron Commander).**—Temp. Capt. G. Dixon-Spain, M.C., Gen. List, from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 2nd Cl.), and to be Temp. Major whilst so employed; Aug. 20th.

**General List (R.F.C.).**—Temp. 2nd Lieut. W. G. B. Cowan resigns his commission owing to physical unsuitability for retention in the Corps; Sept. 7th. Temp. 2nd Lieut. T. R. W. Bulkeley resigns his commission owing to physical unsuitability for retention in the Corps; Sept. 7th.

London Gazette Supplement, September 7th.

The following appointments are made:—

**Wing Commander.**—Capt. (Temp. Major) R. R. Smith-Barry, S.R., from a Sqdn. Comdr., and to be Temp. Lieut.-Col. whilst so employed; Aug. 23rd.

**Flying Officers.**—2nd Lieut. D. G. A. Allen, Durh. L.I., S.R., from a Flying Officer (Ob.); Nov. 5th, 1916, seniority Nov. 21st, 1915 (substituted for the notification in the Gazette of Nov. 25th, 1916). Temp. 2nd Lieut. T. J. Kent, Gen. List; May 24th. Temp. 2nd Lieut. F. L. Smith, Gen. List; June 4th. 2nd Lieut. F. S. Reed, S.R.; June 12th. 2nd Lieut. G. Wallas, S.R.; June 21st. 2nd Lieut. A. S. Hunt, S.R.; July 6th. 2nd Lieut. E. C. Dickens, Gen. List; July 10th.

Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: K. J. Isaac; July 20th. D. M. K. Marendaz; July 28th. Lieut. J. H.



Wensley, Can. Inf.; Aug. 11th. Temp. 2nd Lieut. W. L. Sumsion, D. of Corn. L.I., and to be transf'd. to R.F.C., Gen. List; Aug. 14th. Temp. 2nd Lieut. E. B. O. Bouchier, R. Scots, and to be transf'd. to R.F.C., Gen. List; Temp. 2nd Lieut. B. D. Bate, Gen. List, from an Equipment Officer, 3rd Cl.; Aug. 16th.

Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank: A. H. Caley, H. A. D. Currie, F. D. Grant, N. G. Stranson, G. V. de Boissiere, E. Allingham.

**Flying Officers (Observers).**—Aug. 19th: Temp. 2nd Lieut. T. E. J. MacWeeney, R. Fus., seniority April 26th, and to be transf'd. to R.F.C., Gen. List; 2nd Lieut. F. A. Gill, North'n. R. (T.F.), seniority April 29th, and to be sec'd. 2nd Lieut. G. Bliss, E. Lan. R., seniority May 25th, and to be sec'd.; 2nd Lieut. P. G. Ashford, S.R., seniority June 1st; Lieut. T. W. Morse, Can. Inf., seniority June 22nd; Capt. W. H. Walker, Can. Inf., seniority Aug. 7th.

**Special Appointment (graded as an Equipment Officer, 1st Class).**—Capt. C. W. von Roemer, R.F.A., S.R.; July 16th.

**Equipment Officers, 3rd Class.**—Temp. 2nd Lieut. (on prob.) H. Robinson, Gen. List, and to be confirmed in his rank; July 26th. 2nd Lieut. (Temp. Lieut.) A. R. Langton, R.F.C. (T.F.); Aug. 18th.

**Schools of Instruction (Officers' Technical Training Corps).**

**Commandant.**—Temp. Capt. F. A. Forde, Gen. List, from an Asst. Comdt., Staff Officer, 2nd Cl. (graded as a Brigade Major), and to be Temp. Lieut.-Col. whilst so employed; July 19th.

**General List.**—The date of the appointment as Temp. 2nd Lieut. (on prob.) of J. K. Bell is Aug. 24th, and not as in the Gazette of July 21st. To be Temp. 2nd Lieuts. (on prob.): Lieut. F. Salmon, late Imp. Yeo.; Aug. 24th. Sergt. T. C. Sterndale-Bennett, from O.T.C.; Aug. 28th.

**Supplementary to Regular Corps.**—The following 2nd Lieuts. (on prob.) are confirmed in their rank: J. M. Hancock, G. C. Morris, G. A. Learn, A. Le R. Dean, L. M. Williams, J. Rimmer.

**General List (R.F.C.).**—Temp. 2nd Lieut. W. W. Hillier resigns his commission owing to physical unsuitability for retention in the Corps: Temp. 2nd Lieut. W. M. White resigns his commission with a view to joining an Inf. Officer Cadet Bn.; Temp. 2nd Lieut. J. M. Thomson resigns his commission with a view to joining an Inf. Officer Cadet Bn.; Temp. 2nd Lieut. N. W. Reynard resigns his commission with a view to joining a Cav. Officer Cadet Bn.; Sept. 8th. Temp. Lieut. J. Brown, from Training Res., to be Temp. Lieut. on appointment as prob. to Ind. Army; July 25th. To be Temp. Lieuts. on appointment as prob. to Ind. Army: Lieut. G. W. W. White, from Aust. Light Horse; July 16th. Capt. H. Wrigley, M.C., from Aust. Inf. Bn.; July 25th. To be Temp. 2nd Lieuts.: Regt. Q. Mr. Sergt. E. E. Dunn, No. 17665 Corpl. T. Walsh, D. Cleland, T. J. Nye; Aug. 28th. A. Hanson; Aug. 29th.

**London Gazette Supplement, September 8th.**

The following appointments are made:—

**Flying Officers.**—Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: A. F. McCullough; Aug. 15th. A. W. P. Cumming; Aug. 16th. 2nd Lieut. (on prob.) W. C. Sidaway, S.R.; 2nd Lieut. J. K. Smith, Lan. Fus., and to be sec'd.; Aug. 18th. 2nd Lieut. W. H. G. Milnes, R. War. R., and to be sec'd.; Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank: A. H. F. Brothers, L. A. Budd; Temp. 2nd Lieut. C. W. Band, N. Lan. R., and to be transf'd. to R.F.C., Gen. List. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: A. A. Battson, J. G. Stevenson; Aug. 19th. 2nd Lieut. F. N. Mollet, Hamps. R. (T.F.), and to be sec'd.; Temp. 2nd Lieut. (on prob.) R. Coop, Gen. List, and to be confirmed in his rank; Lieut. W. L. Lister, Yorks. L.I. (T.F.), and to be sec'd.; Lieut. W. M. Miller, Yeo. (T.F.), and to be sec'd.; Aug. 20th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: H. R. Hastings, F. A. Egner, C. R. Brice-Hawley, W. C. Balmford, O. E. Carter, C. S. Read; Aug. 21st.

**Flying Officers (Observers).**—Temp. 2nd Lieut. A. S. Dunn, Lan. Fus., and to be transf'd. to R.F.C., Gen. List; Aug. 20th, seniority April 9th. Temp. 2nd Lieut. T. H. Moorwood, Durh. L.I., seniority Dec. 4th, and to be transf'd. to R.F.C., Gen. List; Temp. 2nd Lieut. E. H. B. Burkitt, Manch. R., seniority April 4th, and to be transf'd. to R.F.C., Gen. List; Temp. 2nd Lieut. L. H. Mackay, Sco. Rif., seniority June 8th; Temp. Lieut. J. A. Hone, Glouc. R., seniority July 22nd; Aug. 21st.

**Equipment Officers, 3rd Class.**—Temp. 2nd Lieut. (on prob.) F. E. Cooper, Gen. List, and to be confirmed in his rank; July 14th. Temp. Lieut. W. E.

Gower, M.C., Gen. List, from a Flying Officer (Ob.); July 18th. Temp. 2nd Lieut. W. B. Shelton, Gen. List, from a Balloon Officer; July 25th. Lieut. G. W. Dobson, Hrs., and to be sec'd.; Aug. 10th. 2nd Lieut. H. B. Langton, R.G.A., S.R.; Aug. 21st.

**School of Aerial Gunnery.**

**Assistant Instructors in Gunnery (graded as Equipment Officers, 3rd Class).**—Temp. Lieut. H. Allsebrook, Gen. List, from an Equipment Officer, 3rd Cl.; 2nd Lieut. (Temp. Lieut.) V. V. Cadman, Middx. R. (T.F.), from a Flying Officer (Ob.); Lieut. F. W. Partington, S. Lan. R., S.R., from a Flying Officer; Lieut. G. H. G. Shepherd, Oxf. and Bucks. L.I. (T.F.), and to be sec'd.; Lieut. L. C. Herne, Can. Inf.; 2nd Lieut. F. Cade, Worc. R. (T.F.), from a Flying Officer (Ob.); 2nd Lieut. E. F. Colman, S. Staff. R. (T.F.), from a Flying Officer; Temp. 2nd Lieut. M. H. Armstrong, Gen. List, from a Flying Officer (Ob.); Temp. 2nd Lieut. J. F. Guinan, Gen. List, from an Equipment Officer, 3rd Cl.; Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: L. M. Hughes, A. G. Edwards, S. J. Elliott; Aug. 15th.

**General List.**—The following Temp. 2nd Lieuts. relinquish their commissions on account of physical unsuitability as Pilots or Obs.: E. P. Griffith, R. J. Brewer, G. L. Chesterton; Sept. 9th.

**Supplementary to Regular Corps.**—2nd Lieut. (on prob.) E. R. Tucker resigns his commission; Sept. 9th.

**General List (R.F.C.).**—Temp. 2nd Lieut. N. C. McClelland resigns his commission with a view to joining an Inf. Officer Cadet Bn.; Sept. 9th. Temp. 2nd Lieut. F. P. Busuttil resigns his commission on account of medical unfitness for retention in the Corps; Sept. 9th.

Temp. 2nd Lieuts. resign their commissions with a view to joining an Inf. Officer Cadet Bn.:—Sept. 9th: J. I. Stockwell, R. I. Limkin, E. V. Calverley, J. McD. Fetherston, C. J. Willett; Sept. 9th. A. Dyer resigns his commission owing to physical unsuitability for retention in the Corps; Sept. 9th.

**London Gazette Supplement, September 10th.**

The following appointments are made:—

**Flight-Commanders.**—Temp. Lieut. P. A. Moodie, Gen. List, from a Flying Officer, and to be Temp. Capt. whilst so employed; Feb. 17th, but without the pay and allowances of that rank prior to Aug. 27th. Capt. N. H. Bottomley, E. York. R., S.R., from a Flying Officer; Aug. 1st.

**Flight-Commanders.**—From Flying Officers: Capt. E. D. Drew, R.W. Surr. R.; Capt. W. A. Skeate, W. York. R.; Aug. 27th. And to be Temp. Capt. whilst so employed: Temp. Lieut. P. G. Marr, Gen. List; Lieut. P. B. Tabernacle, Can. Local Forces; Lieut. H. H. Watkins, R.F.A., S.R.; Temp. Lieut. V. G. A. Bush, Gen. List; Lieut. R. W. A. de H. Haig, R.G.A. (T.F.); 2nd Lieut. (Temp. Lieut.) M. H. Turner, Dorset R., S.R.; 2nd Lieut. (Temp. Lieut.) G. H. Lewis, North'n. R. (T.F.); Temp. Lieut. J. Kerr, Gen. List; 2nd Lieut. (Temp. Lieut.) A. H. Whistler, Dorset R.; 2nd Lieut. (Temp. Lieut.) D. G. A. Allen, Durh. L.I., S.R.; Temp. Lieut. V. H. Baker, M.C., Gen. List; 2nd Lieut. G. A. Giles, S.R.; Temp. Lieut. A. Morrison, Gen. List; Temp. 2nd Lieut. D. M. Faure, Gen. List; Temp. 2nd Lieut. I. E. M. MacKenzie, Gen. List.

**Flying Officers.**—Temp. 2nd Lieut. W. A. Holland, Dorset R., and to be transf'd. to R.F.C., Gen. List; Aug. 8th. Lieut. M. S. McLean, Can. Inf.; Lieut. P. Morency, Can. Inf.; Aug. 16th. 2nd Lieut. (on prob.) H. W. Collier, S.R.; Aug. 18th. Temp. 2nd Lieut. (on prob.) H. D. Humphreys, Gen. List, and to be confirmed in his rank; Aug. 19th. Lieut. C. D. Scott, Can. Gen. List; Aug. 20th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: F. A. W. Mann, J. B. H. Wyman; Aug. 20th.

**Flying Officers (Observers).**—Temp. 2nd Lieut. A. A. Cullen, R. Dub. Fus., and to be transf'd. to R.F.C., Gen. List; July 15th, seniority from Jan. 27th. 2nd Lieut. C. E. Jesse, Wilts. R., seniority April 4th, and to be sec'd.; 2nd Lieut. R. C. Purvis, W. Rid. R. (T.F.), seniority May 3rd, and to be sec'd.; Aug. 23rd.

Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank: S. T. Grant, seniority May 31st. W. K. McMillan, seniority June 27th.

**Special Appointment (graded as a Park Commander).**—Capt. C. A. J. Butter, Yeo. (T.F.), and to be Temp. Major whilst so employed; Aug. 21st.

**General List.**—Temp. 2nd Lieut. R. E. Neve to be Temp. Lieut.; Aug. 1st. Temp. 2nd Lieut. H. J. Bailey relinquishes his commission on account of physical unsuitability as a Pilot or Ob.; Sept. 11th. To be 2nd Lieuts.: Acting Sergt.-Major J. C. Shakeshaft, from R.F.C.; Coy. Sergt.-Major G. Oliver, from Hamps. R.; July 31st. To be Temp. 2nd Lieuts. (on prob.): H. Robinson; July 25th. W. Godfray; Aug. 23rd. M. T. Faure, late Lieut. S. Afr. Inf.; Aug. 25th.



## AIRCRAFT WORK AT THE FRONT.

### OFFICIAL INFORMATION.

**British.**

**General Headquarters, September 2nd.**

"Little flying was possible yesterday owing to rain and high wind, but during the previous night bombing operations were carried out actively by our aeroplanes against hostile aerodromes and railway stations. In air fighting one German machine was brought down. Two of our machines are missing."

**General Headquarters, September 3rd.**

"Last night our aeroplanes dropped over three tons of bombs on the enemy's aerodromes with good results. In air fighting one German machine was brought down out of control. One of our aeroplanes is missing."

**Admiralty, September 4th.**

"A bombing raid by naval aircraft was carried out at midnight on the 3rd inst. on docks, submarine shelters and railway sidings at Bruges. Bombs were observed to explode over objectives, and a fire was caused adjacent to the lock gates of the Ecluse Canal. A raid was also made in the early morning of the 3rd inst. on Varsenaere Aerodrome; bombs were seen to explode amongst the sheds. One of our machines was attacked by six hostile aircraft, and succeeded in shooting down one completely out of control. In an engagement which took place between one of our aircraft patrols and enemy machines, there were three decisive combats. One of our machines failed to return."

**General Headquarters, September 4th.**

"There has been some bombing by the enemy of various places behind our lines during the last two nights. At some of the points attacked a few casualties occurred amongst soldiers and civilians, and some damage was done to private property. No damage of military importance was caused."

"Last night one of the enemy's machines employed on these operations was brought down by our fire."

"The improvement in the weather led to great activity in the air yesterday on both sides. Much successful work was done in co-operation with our artillery, and many photographs were taken. In the course of the day and night over 5 tons of bombs were dropped by our aeroplanes on the enemy's railway stations, billets and aerodromes."

"Enemy aircraft were aggressive in air fighting. Twelve German machines were brought down, and three others were driven down out of control. Seven of our aeroplanes are missing."

**Admiralty, September 5th.**

"At midnight on the 3rd inst. a bombing raid was carried out by naval aircraft on the following military objectives: Bruges Docks, Varsenaere Aerodrome, Ghistelles Aerodrome. Many tons of bombs were dropped with good results. A second raid on Bruges Docks was made at noon on September 4th. Direct hits were observed on special targets. Many sheds along the quayside were also hit, and large fires were caused, which could still be seen burning when machine re-crossed the lines. All machines returned safely from both raids. During Monday afternoon (3rd inst.) an enemy aircraft spotting machines was engaged by one of our fighter patrols, and shot down completely out of control. An enemy kite-balloon was also attacked, and the observer forced to jump out. Owing to anti-aircraft fire the fate of the kite balloon could not be observed."

"A report has been received stating that an attack was carried out against Adrianople on the night of September 2nd-3rd by machines of the R.N.A.S. Bombs were dropped on the railway station and bridge with good effect."

**General Headquarters, September 5th.**

"Last night enemy aeroplanes again dropped bombs at different places behind our lines. A few casualties were caused in one of our hospital areas and some damage done to civilian property. There was no damage of military importance. One of the enemy's raiding machines was brought down by our fire and destroyed. Our aeroplanes have continued bombing operations actively by day and night. Yesterday great activity in the air prevailed on both sides. Our military machines and balloons worked all day in co-operation with our artillery. In spite of vigorous attacks from hostile aeroplanes, a record number of aerial photos. were taken by us, many of them at great distances behind the enemy's lines. Though the enemy's aeroplanes showed themselves disinclined to meet our fighting machines unless well east of the line, five hostile machines were brought down in combat, and nine others driven down out of control. Seven of our machines are missing."

**General Headquarters, September 6th.**

"The following details are now available concerning the bombing operations carried out by our aeroplanes on the 4th inst.:—

"During the day 24 bombs were dropped on enemy's billets at Hantay, east of Lens, and 30 on billets at Lauwin-Planque, in the same area. Five bombs



were dropped on Audenarde railway junction, and seven on Audigny-au-Bac ammunition dump and station of Cambrai. Eight bombs were dropped on Carnieres aerodrome, east of Cambrai, and 61 on various other targets.

"During the night of the 4th-5th bombs were dropped from an average height of 1,000 ft. as follows: Four on a large aerial training school near Valenciennes, 12 on Ramegnies Chin aerodrome, near Tournai; 12 on Somain railway junction sidings (two of which fell directly on the sidings); 17 on Mouvaux and Lezenne aerodrome, near Lille; six on sidings between Douai and Somain; and two on Ledeghem railway station, south of Roulers.

"On the 5th inst., there was again great activity in the air. The enemy on several occasions interrupted the work of our artillery machines and attacked our aeroplanes employed on long-distance bombing raids.

"A few bombs were dropped behind our lines by hostile machines during the night, little damage being done.

"During the day our machines dropped eight bombs on railway sidings near Ghent, five on a large shed at Maubeuge, 54 on billets round Douai, 38 on aerodromes east and north-east of Cambrai, and 61 on various other targets. During the night 10 bombs were dropped by our aeroplanes on aerodromes near Courtrai, eight on an aerodrome east of Lille, and 28 on other targets.

"In air fighting yesterday five enemy machines were brought down and five others driven down out of control. Three of our machines are missing.

"Further information shows that on the night of the 4th-5th inst. German aircraft dropped bombs on three hospitals. The casualties include 80 German prisoners of war, of whom 37 were killed and 43 wounded by bombs dropped by the enemy's aeroplanes."

*General Headquarters, September 7th.*

"On the 6th inst. bad weather caused a diminution of the great aerial activity of the previous two days. A certain amount of bombing was carried out during the day, and over 100 bombs were dropped on various targets.

"Two enemy machines and one German observation balloon were brought down, and two other hostile machines were driven down out of control. One of our machines is missing."

*War Office, September 8th.*

"East Africa.—On September 6th (in the vicinity of Mpondas) our aircraft co-operated successfully with the infantry, setting fire to the enemy's abatis and engaging the defenders with machine-gun fire from a height of 700 ft."

*General Headquarters, September 10th.*

"On the 9th inst. thick mist greatly hindered aerial operations. Artillery co-operation was carried out when possible, and a few bombs were dropped by day and night on hostile aerodromes. Three enemy machines were brought down and four driven down out of control. Five of our machines are missing."

**French.**

*Paris, September 2nd.*

"Two German aeroplanes were brought down by the fire of our anti-aircraft guns on August 10th and 22nd, under particularly difficult conditions. The first machine was hit at 2,000 metres (6,500 ft.) altitude by a motor-gun of the 42nd section. The second, which was flying over our lines at over 5,000 metres (16,250 ft.) altitude, was hit by an explosive shell fired by Post No. 48."

*Paris, September 3rd.*

"German aeroplanes have dropped bombs on Dunkirk and Belfort. At Dunkirk several civilians were killed and injured."

*Paris, September 4th.*

"Last night German machines dropped bombs in the region of Dunkirk and Calais. At the latter point there were several killed and wounded. The region north of Nancy and the neighbourhood of Luneville were also visited by enemy aeroplanes. The material damage done was insignificant. There were no casualties.

"Our bombing machines dropped numerous projectiles on different aerodromes, railway stations and bivouacs in the enemy zone north of Soissons. Another expedition resulted in two fires breaking out in the railway station of Fresnoy-le-Grand. Moreover, we bombarded the railway stations of Roulers and Lichtervelde in Belgium, the aerodromes of Habsheim, Frescati and Colmar, and the railway stations of Conflans, Cambrai, Thionville, Metz-Woippy, where a violent fire broke out, &c. During these expeditions 15,500 kilogrammes (15½ tons) of projectiles were dropped by our squadrons on the enemy objectives, which sustained important damage.

"Yesterday our chaser aeroplanes brought down 13 German machines, most of which were destroyed."

*Paris, September 5th.*

"Last night German aeroplanes again bombarded hospital formations in rear of the Verdun front. It is reported that some of our men were killed and wounded. A large number of bombs were also dropped on Bar-le-Duc. There were some casualties among civil population.

"Yesterday five German aeroplanes were brought down by our pilots, while five other machines fell into their lines seriously damaged. An eleventh German aeroplane was brought down by the fire of our machine guns. As a reprisal for the bombardment carried out by the enemy against our hospital formations, two of our aeroplanes dropped bombs on Treves last night. Our bombing aeroplanes, moreover, made a large number of raids against the railway stations of Roulers and Pethin, the aerodromes of Ghistelles, the ammunition dumps of Thourout, where a violent fire broke out, the barracks of Lahr, the aerodrome of Schlestadt, the factories of Hagondange, &c."

*Paris, September 6th.*

"Some bombs were dropped on Dunkirk, and some people among the civilian population were wounded. Our air squadrons last night bombarded the aerodrome of Marville, the railway station of Challerange, and many enemy bivouacs."

*Paris, September 7th.*

"Three German aeroplanes were brought down on September 5th and 6th as the result of air fights. Twelve other machines were forced to land out of control. During Wednesday night our squadrons dropped 1,100 kilogrammes (over 1 ton) of bombs on the railway station of Thionville and 1,400 kilogrammes on that of Woippy."

*Paris, September 10th.*

"On the 8th and 9th inst. five German machines were brought down in aerial fighting. During recent weeks our pilots have continued their exploits and obtained results. Capt. Guynemer has raised to 50 the number of German machines which he has destroyed. 2nd Lieut. Nungesser has gained his thirtieth victory, and Capt. Heurteaux his twentieth. 2nd Lieuts. Madou, Ortoli, Lufroy and Sergrs. Fonck and Jailer have each accounted for their tenth adversaries."

**Belgian.**

*Havre, September 4th.*

"Some of our aviators, flying at a low altitude, fired with their machine guns on the enemy's trenches north of Dixmude, as well as on a motor transport column drawn up near Beerst."

**Russian.**

*Petrograd, September 3rd.*

"In the region of the lower course of the River Zbrucz, the French airman, Lieut. Lakman, burnt an enemy observation kite-balloon."

*Petrograd, September 6th.*

"On September 1st-2nd our airmen successfully bombarded the railway station of Goloby and depots in the region of Kizel railway, dropping 24 poods (about 865 lbs.) of bombs. On September 2nd 22 poods (about 793 lbs.) of bombs were dropped on the villages of Slonovka and Kluvenyey, to the

south-west of Grjimaloff. In the region of Piatna our artillery brought down an enemy aeroplane, the occupants of which were made prisoners."

*Petrograd, September 7th.*

"Enemy Zeppelins appeared to the south of Pernova (Pernau). Bombs dropped by them near Hainash were without effect.

"On the night of Sept. 5th-6th our airmen carried out a flight over the railway station at Barauovitchi, where 8 poods (about 290 lbs.) of bombs were dropped. In the region to the south-east of Lake Miadziol our artillery brought down an enemy aeroplane, which fell in our lines near the village of Boyary. The enemy airmen were taken prisoners. On the evening of September 5th-6th a squadron of enemy aeroplanes dropped bombs in the region of the railway station of Zamirje."

*Petrograd, September 8th.*

"In the Jacobstadt region enemy aeroplanes have been increasingly active. Bombs were dropped on the city of Jacobstadt. The senior physician of an ambulance corps was killed, and a nurse and a student were wounded.

"Baltic Sea.—In the course of September 7th 23 aeroplanes and battleplanes carried out a series of flights and reconnaissances over Tzerel, Arensburg, and the region of Kuivasta. In the Gulf of Riga five enemy machines attacked without success our torpedo-boat patrols. In an aerial battle near Arensburg our naval airmen brought down an enemy battleplane. The machine was destroyed by fire and the airman perished.

"Our aviators dropped bombs on the small town of Telekhang, on the Ogini Canal, where the staff of a German regiment is stationed. Successful hits were observed."

*Petrograd, September 10th.*

"In the region to the south-east of the small town of Krevo our artillery brought down an enemy aeroplane, which fell near the village of Mekulevstchi. The German aviators were killed. Yesterday, in the region of Luninetz railway station an enemy aeroplane dropped several bombs in the neighbourhood of the hospital. One of the military patients was killed, and 10 patients, three assistants and one small boy were wounded.

"Baltic Sea.—On September 8th, after midnight, enemy hydroplanes dropped 40 bombs on the batteries of Tzerel without effect. In the Gulf of Riga a group of our torpedo-boats was twice attacked by 16 enemy machines, which were met by the concentrated fire of our torpedo boats. Forty bombs were dropped without result.

"An enemy Zeppelin was observed making a reconnaissance to the west of the Island of Oesel."

**Italian.**

*Rome, September 2nd.*

"Our aeroplanes effectively bombarded the reverse of the enemy positions on Mount St. Gabriele. Above Belluno an enemy machine was brought down in an air-fight."

*Rome, September 4th.*

"Last night, in favourable atmospheric conditions, 30 of our aeroplanes flew over Pola and bombarded the military works of this naval port and the enemy fleet at anchor in the harbour and in the Fasana Canal. Nine tons of bombs were dropped on the targets, causing destruction and big conflagrations. Our machines, though attacked by seaplanes and shelled by anti-aircraft batteries, returned safely to their bases. On the night of September 1st-2nd enemy aircraft carried out a bombing raid on some localities in the plain between the Lower Isonzo and the Tagliamento, causing casualties among the civil population and soldiers in hospitals.

"On the St. Julian front more intense artillery and considerable activity on the part of our aeroplanes."

*Rome, September 5th.*

"Two hundred and sixty-one of our aeroplanes participated in the battle for Hill 146, bombarding the enemy's troops and communication lines. On the night of the 4th-5th inst. our air fleet renewed the bombardment of Pola with effective results, and returned safely to its base."

*Rome, September 6th.*

"In the Bazza Valley (Tolmino), east of Chiapovano Valley, in the Boisciezza region, and on the reverse of Hermade, enemy batteries and troops were very effectively bombarded by our aviators.

"On the Trentino front parties of our 'Arditi' destroyed one of the enemy's advanced posts near Daone (Chiese) and emplacements in the Zurez region (east of Lake Garda).

"In consequence of the repeated attacks made by our naval aviators, in conjunction with military airmen, on the military establishments, munition factories and naval buildings in the port of Trieste, the enemy endeavoured to reply last night by an attack on Venice. Several bombs were again dropped on the town, but there were fortunately no casualties or damage."

*Rome, September 7th.*

"Our aeroplanes repeatedly destroyed or threw into confusion enemy batteries of the Panovizza Wood and Ternovo Forest, and in the communication lines on the Carso."

*Rome, September 10th.*

"Our aeroplanes bombarded enemy batteries in the Ternova Forest. The enemy attacked them with intense anti-aircraft fire."

**German.**

*Berlin, September 2nd.*

"Baron von Richthofen yesterday achieved his sixtieth aerial victory."

*Berlin, September 5th.*

"By day and by night there has been very vigorous aerial activity and numerous bombing enterprises. Far distant objectives were successfully attacked with bombs—Dover, Boulogne and Calais. Twenty-two enemy aeroplanes were shot down. Lieut. Voss brought down his thirty-ninth opponent."

*Berlin, September 6th.*

"Fourteen enemy airmen and one captive balloon were shot down yesterday over the Continent."

*Berlin, September 7th.*

"Nine enemy aeroplanes were brought down in aerial engagements, and five further machines by anti-aircraft guns."

*Berlin, September 10th.*

"In the month of August 64 of our aeroplanes which went out against the enemy have not returned. Four of our captive balloons were shot down. In the same period the losses of our enemies amount to 37 captive balloons and at least 295 aeroplanes, of which 126 were brought down in flames behind our lines and 169 on the other side of the enemy lines."

**Austrian.**

*Vienna, September 1st.*

"Trieste has again been the objective of Italian airmen, and the Episcopal Palace has been damaged."

*Vienna, September 3rd.*

"Italian airmen dropped bombs on several towns on the west coast of Istria. An enemy air squadron making for Trieste was driven back by our naval planes before it reached its objective."

*Vienna, September 9th.*

"As a reprisal for the repeated attacks of enemy aviators on the open town of Trieste, our hydroplanes, on the night of the 7th, copiously and most successfully dropped bombs on the naval arsenal and military establishments of Venice. Numerous hits were reliably observed. All our aeroplanes returned."

"Our aerial reconnaissances reveal considerable animation at the advanced railway stations of the enemy in the Jacobstadt and Dvinsk regions."





### Casualties.

Lieutenant ROBERT LESLIE CLEGG, Lancashire Fusiliers and R.F.C., only son of Mr. and Mrs. Robert-J. Clegg, of Holbeck, Windermere, was killed on September 3rd. Born in 1887, he was educated at Mulgrave Castle by the Rev. the Marquess of Normanby, at Uppingham, and later in France and Germany. At the outbreak of war he was in Ceylon, and immediately came home, enlisting in the Royal Engineers as a despatch rider. In October, 1914, he was gazetted to the 4th Lancashire Fusiliers, and joined the 9th Battalion in Gallipoli on September 8th, 1915, where for some time he commanded a company. Soon after the evacuation he transferred to the R.F.C. and served in Egypt, latterly being a Flying Instructor until invalided home last May. He left for the front in August, and was killed while flying over the German lines.

Second Lieutenant RICHARD JOHN GRANDIN, A.S.C., attached R.F.C., was born at St. Heliers, Jersey, in 1892, the only son of Mr. J. E. and the late Mrs. Grandin, of St. Heliers. He was educated at Victoria College, which he left at the age of 15 to join the training ship "Conway." As he failed in the last colour test, he was in the ship only six months, and then completed his education at the Lycée of St. Breux, in France. He obtained a commission in the Jersey Militia in December, 1909, and commanded a company for over four years. Seeing no prospect of service overseas, he applied, in November, 1914, for a temporary commission as Lieutenant in the A.S.C., which he obtained, and was gazetted Temporary Captain in April, 1915. He left for Egypt at the end of the year. He obtained his regular commission in June, 1916 (antedated September 28th, 1915), and after serving in Egypt 15 months, exchanged into the R.F.C. in November, 1916. He came home to complete his training, left for another front last April, and was Acting Flight-Commander when he was reported "missing" on May 18th, being reported killed on that date on September 8th. He was a fine sportsman, being especially keen on yachting. In April, 1915, he married Marguerite, youngest daughter of Mrs. and the late G. A. Pitcher, of 58, Anson Road, Tufnell Park.

Second Lieutenant C. A. HARGREAVES, R.F.C., whose death has occurred from wounds received in action, was the younger son of Mr. A. and Mrs. Hargreaves, of Warham Road, Harringay, N. Last month he destroyed a German aeroplane, and two days later he was severely wounded, but he brought his machine and observer back safely.

Lieutenant REGINALD HAYES, R.F.C., second son of Mr. and Mrs. Thomas Hayes, of Sudbrooke Road, Wandsworth Common, was killed while flying over the German lines, aged 19. He entered the Army with a commission in January, 1915, and for two years was attached to the South Lancashire Regiment. He was wounded last November, and in January returned to the front, and three months later was transferred to the R.F.C. He was in many air fights, and his death occurred on his first flight after his return from leave.

Second Lieutenant CECIL GRAHAM HOLMAN, K.O.S.B. and R.F.C., who died of wounds on September 5th, was the only son of Mr. and Mrs. W. G. Holman, 3A, Cromwell Crescent, S.W. He was born in March, 1897, and was educated at the Philberds, Holyport, Frinton College, and Rossall School. At the beginning of the war he enlisted in a Public Schools Battalion, and soon after received a temporary commission in the Yorkshire Regiment. Later he was gazetted Second Lieutenant in the King's Own Scottish Borderers, but he joined the R.F.C. in 1916, acting as Observer at the front for eight months. In April, 1917, he was promoted to Flying Officer with a squadron at the front.

Lieutenant ARTHUR JAMES LEWIS O'BEIRNE, Yeomanry, attached R.F.C., was the only surviving son of Major O'Beirne (late Royal Warwickshire Regiment) and Mrs. O'Beirne, of Astrop Grange, near Banbury, and Aughera, Co. Longford, Ireland. He was educated at Summerfields, Oxford, Radley College, where he was in the first eleven, and at Exeter

College, Oxford, where he was whip to the College Beagles. When war broke out he had just arrived in British East Africa, and immediately enlisted as a trooper in the East African Mounted Rifles. After nine months' fighting he was invalided home, and was then offered a commission in the Oxfordshire Yeomanry. In December, 1916, he joined the R.F.C., and after obtaining his Pilot's certificate was for some time in England. He went to the front last July, and died of wounds received in action on the 28th of that month. His only brother, Lieutenant John I. M. O'Beirne, Royal Warwickshire Regiment, attached R.F.C., was killed at the front last April.

Lieutenant WILLIAM EDWYN SANDYS, R.F.C., who was killed on September 5th, was the only son of Mr. and Mrs. E. F. Sandys, of Calcutta and Blackheath, S.E. He was born in Calcutta in December, 1890, and was educated first at Bath, afterwards at St. Paul's School, where he won his colours for rowing and swimming. He was for some years in America and Canada. Being in Lillooet, B.C., at the outbreak of war, he immediately joined the first Canadian Contingent in Lord Strathcona's Horse (R.C.). He was presented by friends in Lillooet with a gold watch as a token of their esteem for the recruiting work he had done. He crossed to England in October, 1914, while in camp on Salisbury Plain obtained his commission in the A.S.C., and was gazetted on January 21st, 1915. He embarked for Egypt in December, 1915, as Adjutant to his brother-in-law, Captain R. J. Grandin, O.C. troopship. He left Egypt for another front in February, 1916, and exchanged into the R.F.C. in June, 1916, in which he was very soon made an instructor. He acted as Flight-Commander in Scotland and England, and passed his technical examination at Oxford first in all subjects. He left for the front on August 1st, 1917, and was killed on September 5th, 1917 (his wife's birthday). He was a fine all-round sportsman, especially horseman, was very musical, and had travelled extensively. He married, on September 4th, 1915, Elsie, daughter of Mrs. and the late Mr. G. A. Pitcher, of 58, Anson Road, N.7.

Second Lieutenant JAMES HERBERT SAYER, R.F.C., who was reported missing on April 3rd and is now officially presumed to have been killed on that date, whilst engaged on a photographic reconnaissance, aged 19, was the elder son of Mr. and Mrs. C. J. Sayer, of Wallington. He was educated at the Whitgift Grammar School, Croydon, where he was a Sergeant in the O.T.C. He was also captain of the first fifteen and of the school shooting eight. He left the school in June, 1916, to take a commission in the R.F.C., and went to the front in the beginning of last November, having for some time previously acted as an Assistant Instructor.

Second Lieutenant JOHN FRANCIS ASHBURNHAM WODEHOUSE, Duke of Cornwall's Light Infantry and R.F.C., killed on August 26th, aged 20, was the only son of the late Francis John Wodehouse, and grandson of the late Rev. Algernon Wodehouse, M.A., rector of Easton, Hants. He was educated at Ardingly College, Hayward's Heath, and while there joined the O.T.C. He obtained his commission in the D.C.L.I. in 1915, and was wounded last year. After returning to the front he joined the R.F.C. as an Artillery Observation Officer, and, as such, met his death.

Second Lieutenant LEONARD H. ASTON, R.F.C., who was killed in a practice flight on September 6th, was the second son of Mr. and Mrs. Frederick Aston, of Durlston Road, Kingston. He joined the R.N.A.S. at the beginning of the war, becoming C.P.O., and afterwards secured a commission in the R.F.C. kite-balloon section. After serving in France for some time, he returned to England to take his pilot's certificate.

Lieutenant ARTHUR DORICOURT ROBERTS, M.C., who was killed while flying on August 31st, through his machine breaking in the air, was the youngest son of the late David Thomas Roberts, C.S.I. Born in India, he was educated at Cheltenham Junior School and Cheltenham College, at



both of which he held scholarships. From the college he took a classical scholarship at Queen's College, Oxford, where he had been for a year when war broke out. He got a commission in the Scottish Rifles, and went to the front in the autumn of 1915, having command of a machine-gun section. In September, 1916, he received the Military Cross for "conspicuous gallantry in action," and was soon after transferred to the R.F.C. as Observer. Mr. Roberts had gained his wings as a Pilot a few days before the accident occurred.

#### Missing.

The Rev. Henry Moody, Vicar of Welshampton, Shropshire, has received official information that his son, Second Lieutenant CHARLES ANGELO MOODY, R.F.C., is missing. His twin brother, Second Lieutenant Henry Michael Moody, R.F.C., also serving in France and stated missing, is now reported safe.

#### Prisoners of War.

Mr. S. Jordan Kent, of Messrs. Bransom, Kent and Co., has received letters from his son, Sub-Lieutenant R. LESLIE KENT, R.N.A.S., stating that he is well and a prisoner-of-war at Heidelberg. He is evidently the officer whose name is given as Kent in the German list of Sopwith, single-seater triplanes in the hands of the enemy given in our last week's issue.

The parents of Second Lieutenant G. A. H. PARKES, R.F.C., of Upper Staplehall, Northfield, Birmingham, who was

reported missing on July 15th last, have now received word from him that he is wounded and a prisoner in German hands at Johannisthal, Stettin.

#### Married and to be Married.

A marriage has been arranged and will shortly take place at Houghton, Stockbridge, Hants, between Major RODERIC HILL, M.C., Royal Flying Corps, elder son of Professor and Mrs. M. J. M. Hill, and HELEN, elder daughter of Lieut.-Col. E. R. MORTON, Indian Army, retired, and Mrs. MORTON (née Edwards, of Mess Strange, Shropshire).

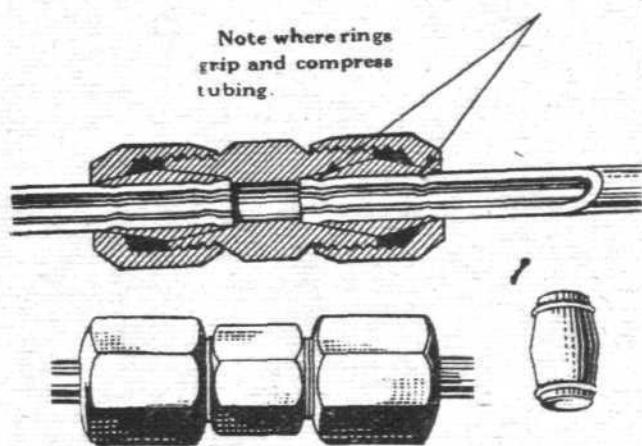
The marriage arranged between Captain JAMES LINE, R.F.C., son of Mr. and Mrs. C. A. Line, Edgbaston, Birmingham, and DOROTHY BEATRICE GERTRUDE, second daughter of Lieutenant-Colonel and Mrs. H. P. DIMMOCK, 23, Homefield Road, Wimbledon, S.W., took place on August 8th at St. Mary's Church, Wimbledon.

The marriage arranged between Major ERNEST LITHGOW, R.A.M.C. and R.F.C., and Miss DOBIS BALFOUR will take place at the Parish Church, Tetbury, on Tuesday, October 2nd, at 11.30.

The engagement is announced between Captain JOHN LEAM MIDDLETON, R.F.C., elder son of the late Town Clerk of Chesterfield and of Mrs. Middleton, of Hasland, Chesterfield, and MARGARET, elder daughter of the late Alderman S. E. SHORT, J.P., and of Mrs. Short, of Brampton Manor, Chesterfield.

## A NEW SAFETY COUPLING JOINT.

It was ever the little things that counted most for comfort in motoring—and in flight, for absolute safety. One of these is the jointing of fuel and water connections. Do we



not all remember the late Gustav Hamel having to finish the last lap of the circuit of London he won a week or two before his death with one finger stopping a leak in a burst

petrol connection? How easily might a stray spark have sent the whole machine down in a blaze. How many machines have so been destroyed, before and since? Now, of the three conventional ways of making these joints, soldering is inadmissibly defective whilst the factor of vibration exists. Thread-cutting is little better, because even when threads do not strip from the soft metal, they wear rapidly with every disconnection, and soon leak; and flanging, apparently strongest, is really the least reliable, as a flange may tear if the metal be over soft. Nothing short of a coned joint meets the case, but hitherto mechanical considerations have prevented its employment. But the Dolmer high-compression coupling—illustrated herewith—which is marketed by the Ohio Metal Products Co., of Dayton, O., and, 616, Free Press Buildings, Detroit, Mich., embodies this principle, and, as will be seen, gets its essential thread connection exactly where no strains come, these being taken on the internally-coned faces of the intermediate sleeve connection, and still more by the complementary cones of the internal packing thimbles, which grip the tubing, and are themselves gripped in an outer coned joint by the ends of the connecting nuts. Such a connection as this is as nearly as possible vibration-proof; and the thimbles, the heart of the construction, do not crush the tubing. This Dolmer coupling is said to have been tested to 4,200 lbs. without any sign of leakage or weakening.

#### Air Fighting at the Front.

WRITING to the *Daily Mail* from the War Correspondents' Headquarters in France, Mr. W. Beach Thomas says:—

"The development of battle in the air during the last few weeks is beyond record, especially in night fighting.

"For example, last night it looked as if we were trying to set the moon alight with matches, so perpetual was the flash of shrapnel south-eastwards, in which direction I happened to be driving. But shrapnel matches were being as busily struck in other directions.

"Several fights took place in the moonlight. Our own planes hummed and flashed everywhere, and we dropped many tons of bombs across the German lines. The new and heavier machines belonging to all armies, of course, permit of carrying vastly greater weights. The bombs themselves are heavier as well as more numerous. The enemy, for example, attacked our hospitals with bombs holding more than 250 lbs. of explosive apiece, and a few were heavier still.

"The climax was perhaps reached last night and the day before, and it happened that one of the greatest pioneers of aviation was watching there to see it all and was one of the most astonished observers.

"It happened that a great piece of shrapnel case fell into his car as he watched, but, happily, dropped just between himself and his chauffeur. This piece will be associated with his other souvenirs of the history of aircraft.

"The 'Archies,' too, have developed. The Germans now use guns of at least 6-in. calibre for firing at aeroplanes, as

well as rockets and other devices, and air barrages are not uncommonly seen. The enemy is the apostle of night bombing, which is semi-blind even during the harvest moon, now gibbous, but the general activity has increased, and he attempts to secure observation of gunfire by sending out a little fleet of machines to report for a single gun. Early-morning spying along the roads by low-flying planes is another of his favourite amusements."

#### "The Wonder Book of the Navy."

APTLY, indeed, is this collection of stories and pictures of the Navy at work named. Edited by Mr. Harry Golding, it contains articles and stories by such well-known writers, among others, as Mr. Archibald Hurd and Mr. Gerard Fienes, while the artists, whose pictures are given in colour, include Mr. C. Napier Hemy, R.A., Mr. Arthur W. Burgess, R.I., Mr. Charles Dixon, R.I., Mr. Charles J. de Lacy, Mr. Bernard F. Gribble and Mr. Maurice Randall. Dealing, as the book does, with the many sides of life in the Navy, it is, of course, inevitable that the Royal Naval Air Service should come in for its share of notice; and "J.J.B.," in a rapid sketch, deals briefly with the work of airships, seaplanes, flying boats and kite-balloons. Altogether it is a most fascinating volume, and any boy who is fortunate enough to get a copy will treasure it as a trove indeed. There are photographs galore, and every one is instructive. The price of the book, which is published by Messrs. Ward, Lock and Co., is 3s. 6d. in coloured boards, or 5s. in cloth-binding.



## SIDE-WINDS.

WE were pleased to notice when in Birmingham the other day, the considerable extensions which are being carried out in the aeronautical department of Messrs. Harris and Sheldon, at Stafford Street, Birmingham. This indicates that the demand for components by these makers is on the increase, a fact which speaks for itself.

QUEEN AMELIE of Portugal, who is president of the Richmond District Girl Guides, was present on Saturday evening at Buccleuch House, Richmond (the residence of Mr. and Mrs. J. A. Whitehead), at a very interesting display given by the members of the corps.

ACCORDING to reports from America arrangements have been completed by which the well-known motor car building firm, the Willys Overland Co., have secured not only control, but also ownership of the Curtiss Aeroplane and Motor Corporation. It will be recalled that for some time the two firms have been working in close co-operation, but now the Curtiss Co. has the same board of directors and nearly the same list of officers as the Willys Overland Co. It is stated that the factories in Marblehead, Mass., Hammondsport and Buffalo, N.Y., Toronto, Ont., are being worked to their full capacity, and erection of the new plant in Toledo, O., adjacent to the main Overland works, is being rushed to the utmost.

WHITEHEAD AIRCRAFT continue to soar higher than ever, as regards both the output and their organisation as an industrial undertaking. It has been deemed necessary in the latter connection to increase the capital to a round million sterling, to which the shareholders of Whitehead Aircraft, Ltd., have unanimously agreed, with the result that a new (nominally) firm has come into being under the title of Whitehead Aircraft (1917), Ltd., which takes over the entire concern, lock, stock and barrel, the old company in due course being put to rest under the usual formality termed "Voluntary Liquidation." Needless to say, the presiding genius, Mr. J. A. Whitehead, goes over to the 1917 company as part of the "lock, stock and barrel." Nothing succeeds like success.

VIBRATIONS set up in streamline wires under flying conditions and the minimising thereof has for some time engaged the attention of Mr. A. L. Anderson, of 6, Springfield Road, Gatley, Cheshire. He is the inventor and patentee of a contrivance known as "The Anderson Acorn." This, as its name implies, is of streamline shape and designed to grip two wires at their crossing, thereby binding them closely together. The cone is slotted to take the two wires. A small insulated packing piece has been inserted, and when the two halves of the acorn are securely fastened together, the wires are locked tightly and the reduction of vibration thus secured. We understand that the invention has the approval of the Air Board, and that its manufacture is not confined or limited to any particular material, but can be made to include any

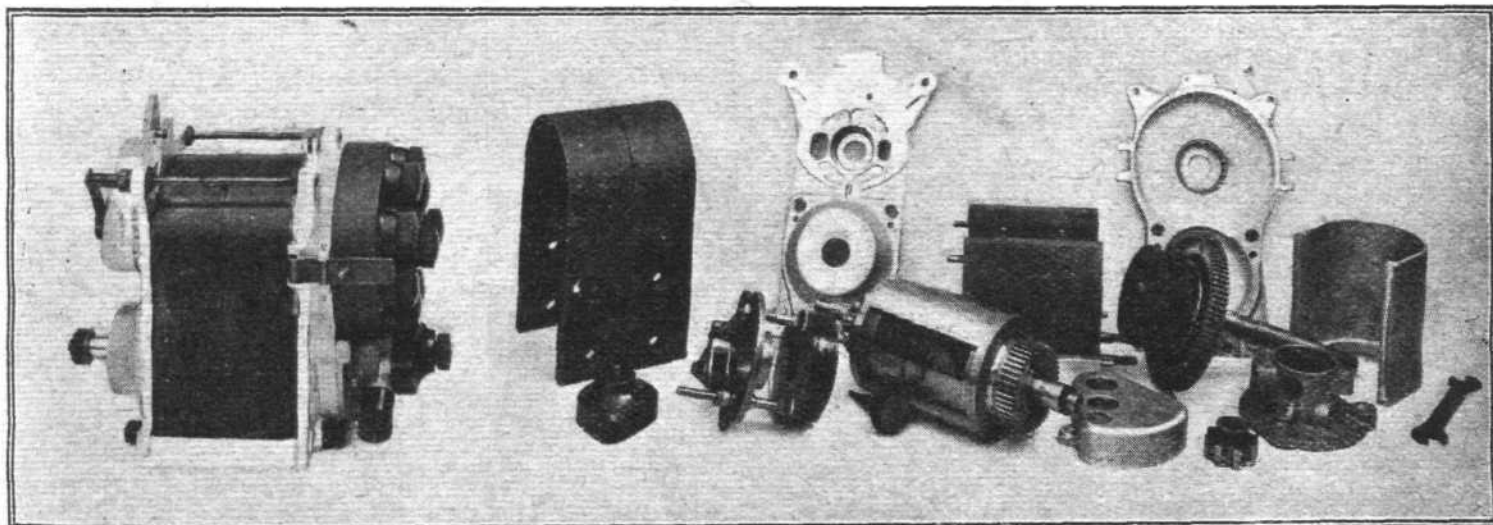
kind of hardwood, fibre or aluminium. It appears that this method should be superior to that of binding with tape or wire, which must in time be cut through by the movement of the wires. It is an interesting device and worth the attention of those concerned with this subject.

THE first annual sports of the Sopwith Aviation Co. are fixed for this Saturday, September 15th, to take place on the grounds of the Old Kingstonians, Kingston-on-Thames, at 2 p.m. Given a fine day good sport should prevail, for there are five open events including the inevitable tug-of-war for teams of eight. In addition, there is a special invitation race of a 100 yards handicap open to the R.F.C. and R.N.A.S. only. The Sopwith orchestra will discourse sweet music during the afternoon, and further cater for those who care to take a turn at dancing in the evening from 7 o'clock onwards. A concert by the Sopwith Choral Society is a further promising attraction. As to prices of admission, 6d. and 1s. will cover this and the tax, whilst there will be a selection of needful refreshments at popular prices.

THE business conducted by E. Kalker and Co., of Coventry, one with an enviable reputation consistently built up since the very earliest days of motoring, is adding new laurels to its record by reason of the quality of the goods supplied to the aviation industry. Messrs. Kalker are renowned for all types of cables and flexibles, and their efforts are now centred in the special cables for aero engines made up to the specifications of the A.I.D. These cables, particularly their 111A special magneto cable, are of such uniform high quality that the firm claim that not one inch of the many miles they have submitted has ever been rejected. Armoured lighting cables in single, twin or triple core, together with brass and aluminium strip armoured, are also to the fore in their manufactures, as are also the ignition cables supplied to the Government for "Tanks" and W.O. lorries.

"SUMMER-TIME" ceases on Monday next, and the clocks will be put back to sun time. Dark days loom ahead, and the lengthening evenings are already noticeable. The time is here when the lighting of workshops will have to receive more attention than in the immediate past. Ediswan lamps have proved their efficiency in the past, and no effort is spared to maintain the reputation which has been made. The Ediswan Electrical Co., of Ponders End, will be pleased to send illustrated lists and give full particulars of the lamps of their manufacture on receipt of a post-card. One point: it is well to remember that glass is none too plentiful in England at the moment, nor are many other materials necessary to the manufacture of electric lighting appliances. Better therefore be early than get left in the dark.

THE Grahame-White Aviation Co., Ltd., inform us that Mr. F. H. Payne has resigned his position as director of the company, and that Mr. Claude Grahame-White is now the sole managing-director.



The latest Blic magneto—the H.L.8.—designed for use on high-speed engines. This machine has a stationary armature with a revolving sleeve, thus giving four sparks during each revolution. By this means the rotating mass is reduced to a minimum, and as double the number of ignition points are given it can be driven by gears running at much lower speeds than with the usual type of magneto. Our views show the machine complete (on the left), and with the various parts disassembled.

## French Honours for R.N.A.S. Pilots.

It was announced in Paris, on August 31st, that the *Croix de Guerre*, with citation in a French army order, has been conferred on Flight Sub-Lieuts. J. E. Sharman, W. E. Flett, and A. C. Disetie, of the R.N.A.S.

## Aerial Activity in Flanders.

ACCORDING to a message from the Belgo-Dutch frontier last evening and night there was tremendous aerial activity over Flanders, says the *Daily Telegraph* correspondent in Rotterdam, under date of September 5th. Throughout the night, with only a few short intervals, the German anti-aircraft guns were in action, and every few minutes could be heard the louder explosions of bombs. Many machines were clearly seen from the frontier. One report says that what took place was in effect a great aerial bombardment by the Allies' flyers of the German positions of military importance behind the Flanders front.

## Germans Bomb Germans.

IN giving details of some recent German raids on French territory, a *Temps* special correspondent says that at one place, which was bombed some hundred German prisoners were being moved, and an enemy pilot, thinking they were British troops on the march, descended to a height of 300 ft. and threw three bombs, killing 43 of the prisoners and severely wounding 47.

On September 2nd, an unknown number of aeroplanes dropped on Calais some hundreds of objects resembling "Madeleines," covered with a substance resembling chocolate icing, which the chemists are analysing. On September 3rd another lot of aeroplanes threw bombs of a kind hitherto unknown, which did no damage worth mentioning.

One enemy aeroplane was brought down at Calais and two others on September 4th, at Dunkirk.

## Bright Boys, the R.F.C.!

THE following story, which is attributed in the *Daily News* to a wounded pilot back from France, suggests resourcefulness of a pretty high order as attached to R.F.C. officers:—

"They saw," he says, "something doing in the rear of the Hun lines, flew down to have a closer look, and came under the fire of some 'Archies.' A direct hit smashed the engine. The pilot didn't lose control, but planed down as much in the direction of the British line as he could. They came to earth inside the Boche lines, unhurt, nipped out of the ruined 'bus' pretty quick, and started running in the direction of the British trenches.

"After running for some time, they spotted a sort of erection affair, like a big gun-pit. They crept closer and heard the Boches talking. It was a gun-pit, so they squatted down and made a sketch-map of it, with a bearing or two to get the proper range. After that they crept and ran and crawled until they got to the bank of the canal. They had to swim for it, and as they left the bank a couple of Boche snipers got a bead on them, and they had just time to locate the beggars hiding in sunken barrels before they dived. They swam under water, coming up for a breather now and then, with the Boche snipers blazing away, but they got through all right. While still dressed only in wet shirts, they got on the 'phone to our heavies, and gave the exact location of that gun-pit, as well as the two barrels. Next thing that happened was a series of direct hits on that gun emplacement, and the two snipers' barrels were sent sky-high."

## Tuition by Correspondence.

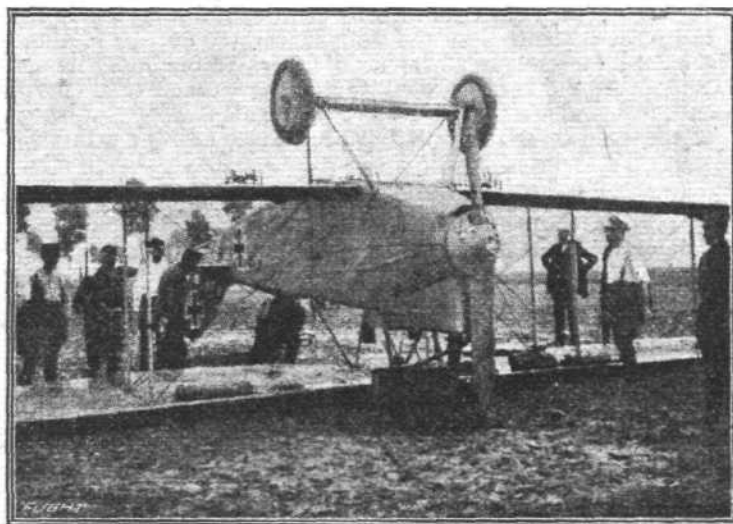
WHILE it must be confessed that tuition by correspondence has its limitations, there can be no doubt that in certain circumstances it is capable of giving very valuable assistance to those who are anxious to increase their knowledge in any particular direction, but are unable to attend regular classes. There are, for instance, many draughtsmen who have found themselves called upon to transfer their energies from general to aircraft engineering, and who want an introduction to the new branch. To this end a course of twelve correspondence lessons has been drawn up by Mr. S. T. G. Andrews, B.Sc. (Eng.)—of the Thorough Classes—which, although it costs but a guinea, gives quite a comprehensive survey from an elementary point of view of aeronautics. The scope of the course can best be judged from the heads of the various lessons as follows:—

1. Historical.
2. Types of aeroplanes and the functions of the members.
3. Experimental aeronautics.
4. Experimental results of general utility.
5. Applications of experimental results.
6. Aeronautical instruments.
7. General lay-out of an aeroplane.
8. The factor of safety; design of the wings.
9. Design of the fuselage, tail and controls.
10. Aero engines.
11. Design of the chassis and engine connections.
12. The propeller.

The lessons are all clearly set forth, and wherever necessary diagrams are given which will greatly assist the student, who really sets to work to get full value out of the lessons. For those who, after completing this "elementary" course, wish to continue their studies, Mr. Andrews has drawn up an advanced course, and full particulars of both he will be pleased to send to anyone who writes to him at 80, Shakespeare Crescent, Manor Park, E.12.

## Air Raid Damage Claims.

AT the London Sessions, on September 5th, Stephen White, police constable of the Port of London Authority, was acquitted of a charge of attempting to obtain £33 15s. from the Mayor and Town Clerk of Poplar with intent to defraud. The accused had his house bombed in an air raid, and obtained £36 6s. 6d. compensation from the *Daily News* Fund. It was alleged that he attempted in addition to obtain compensation from the Poplar local fund. The defendant, who was given a high character, stated that he had made no secret of the fact that he had received money from the fund mentioned.



A German aeroplane brought down at Aardenburg in Holland; the occupants were interned. The machine appears to be an Aviatik D.F.W.—(From "Het Vliegvelde.")

## PUBLICATION RECEIVED.

### Catalogue.

M-L Magneto.—The M-L Magneto Syndicate, Ltd., Victoria Works, Coventry.

## Aeronautical Patents Published.

### Applied for in 1916.

The numbers in brackets are those under which the Specifications will be printed and abridged, &c.

Published September 13th, 1917.

- 9,747. C. R. B. FROST AND G. THORNE. I.C. engines for use with aircraft. (108,694.)  
12,299. R. G. BOOTH. Ignition terminals for aeroplane engines. (108,745.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlii, xliii and xliv).

## FLIGHT

and the "Aircraft Engineer."

44, ST. MARTIN'S LANE, LONDON, W.C. 2.  
Tel-graphic address: Truditor, Westrand, London.  
Telephone: 1828 Gerrard.

## SUBSCRIPTION RATES.

"FLIGHT" will be forwarded, post free, at the following rates:—

UNITED KINGDOM.			ABROAD.		
	s.	d.		s.	d.
3 Months, Post Free..	3	10	3 Months, Post Free..	5	0
6 " " " " " "	7	7	6 " " " " " "	10	0
12 " " " " " "	15	2	12 " " " " " "	20	0

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 44, St. Martin's Lane, W.C. 2, and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.